SOUTHERN POWER AND INDUSTRY

All body was \$44

JUNE 1952

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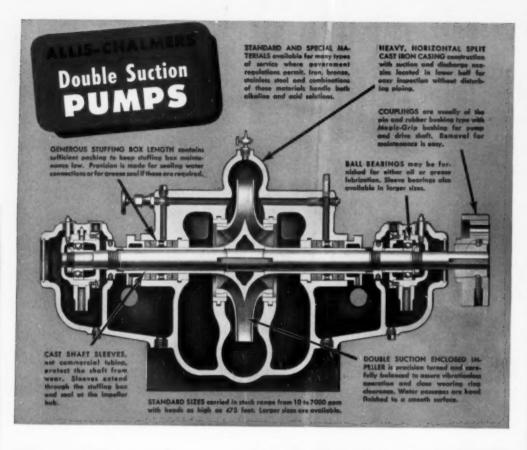
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Built for LONG LIFE



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Allis-Chalmers Type S pumps. Extra metal thicknesses, extra strong parts, extra construction features, and extra careful workmanship are always there to give you long life, low maintenance and low cost per gallon pumped.

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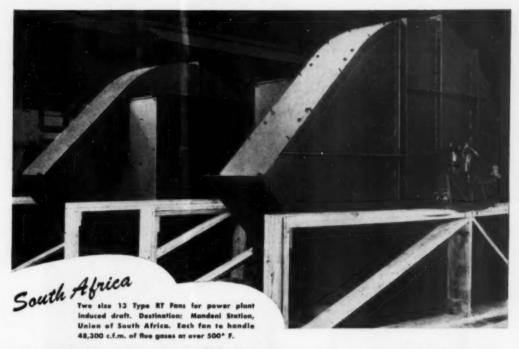
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Volume 70

Number 6



Clarage HEAVY-DUTY Induced Draft Fans Travel a Long Way to Make Good



SEND FOR CATALOG 901

Type RT fan specifications and equipment arrangements for induced draft, forced draft and industrial air handling services are covered in this catalog. Write for your copy today. Shipped five months ago, these Type RT Fans are now in operation almost halfway around the world from Clarage service . . .

But whether you are 50 miles from us — or 10,000 — makes little difference when you install Type RT fan equipment.

Every RT fan part — wheels, bearings, shaft, housing — is HEAVY-DUTY construction. You are not likely to need repair parts for a long time to come!

That is why this excellent mechanical draft equipment is now operating in 43 states and 15 foreign countries.

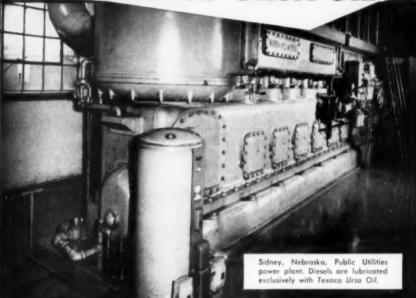


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Leading engine builders approve Texaco Ursa Oils, and there is a complete line to assure top performance from every type and size of Diesel engine. That's why —

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SOUTHERN POWER AND INDUSTRY





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PRACTICAL DISCUSSION

Ring Gives Proper Screw Size Num- ber	Maintenance Savings with the Impact Tool
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Editorial and Executive Offices: SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E., ATLANTA S., GEORGIA

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

June, 1952

DESIGN PREVIEW OF PLANT X — largest of Southwestern Public Service Company's 11 generating stations — is featured in this issue. Initial 50,000 kw G-E unit is scheduled for commercial operation this month; second G-E unit of 100,000 kw capability in mid-1953. C-E 500,000 and 1,000,000 lb/hr boilers are being installed for outdoor service. By June of 1953, the company will have a generating capability of over 500,000 kw, serving homes, businesses and industries of the Texas Panhandle and Eastern New Mexico.

Design features include an unusual cooling tower arrangement. There are two towers per generating unit, operating in parallel and placed in wheel-spoke configuration. Thus, performance is not affected by wind direction, compact arrangement is an aid to operation, maximum saturable air volume is contained with minimum circumference, and first costs have been minimized since pipe and flume lengths are reduced.

Another feature, reported by E. W. Robinson, System Plant Engineer, is an automatic control-feeding system for injection of sulfuric acid for scale prevention and chlorine for algae control in condenser water. For design details check the semi-technical description in this issue.

■ GLASS PRODUCT MANUFACTURE is an exceedingly "hot" operation with temperatures well above 2,000 F usually employed. Owens-Corning's new Fiberglas plant at Anderson, South Carolina, is air conditioned throughout production, service shop, and office areas. Carrier system holds temperatures to a maximum of 80 F and eliminates more than 90 per cent of the heat radiations in the area surrounded on three sides by glass melting furnaces.

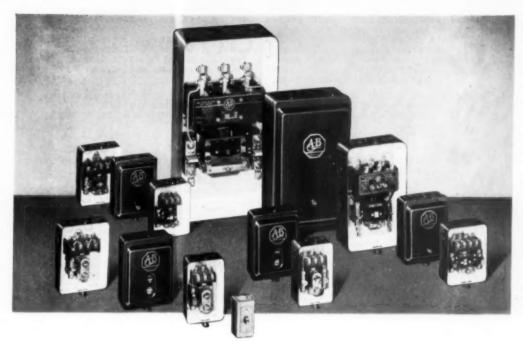
Unusual system combines RADIANT PANEL COOLING WITH DISTRIBUTION OF COMPLETELY CONDITIONED AIR. Radiant cooling panels shield the working aisles from the melting tanks and forehearths. Panels cut off heat radiation and handle about 70 per cent of the cooling. Panels are made of two thin sheets of steel welded together, with one of the sheets embossed to provide water circuits within the panel.

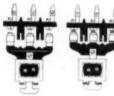
EMPLOYEE IDENTIFICATION SYSTEM, demonstrated at the recent A.S.T.E. Show employed a Polaroid 60 second Land Camera and Anderson & Sons' Badge Master. Employee or plant visitor identification is automatically taken in duplicate, pictures developed within the camera and ready for use in one minute. Photo is trimmed and identification badge rapidly assembled with the Badge Master.

Where positive identification is required for security reasons, a thumb print can be placed on one print when it is first removed from the camera and while the picture is damp. Thumb print (usually used) becomes a part of personnel record file. For details, write Anderson & Sons, Inc., Westfield, Mass.

■ DAMAGED CONVEYOR BELTING? Suggestions on repairing gouges, holes, longitudinal and transverse rips, and long, deep cuts which go through to the fabric, are featured in this issue. Adequate repair kit items are tabulated. Only very large users of conveyor belting will find it necessary to vulcanize their own belt patches and splices.

(Continued on page 6)





SIMPLE-Only One Moving Part

The key to the remarkable performance of Allen-Bradley sole noid starters is their simplicity. They have no pins, pivots, or bearings to stick . . . there are no flexible jumpers to break.

There is just the one-piece solenoid plunger in a frictionless slide. Such simplicity means long, trouble free operation in the toughest type of service.

Here is a full line of motor starters Manual or Automatic—Single or Polyphase

If you use different types and sizes of motor starters on your machines . . . it will pay to standardize on the Allen-Bradley line.

Why? Because this line is uniform in design up to 300 hp. All Allen-Bradley starters are solenoid or straight line operated . . . with maintenance free, silver alloy contacts . . . and dependable overload relays. Allen-Bradley manual and auto-

matic starters are nationally advertised. They are recognized the world ground as Quality Motor Controls by important machinery buyers, plant engineers, contractors, and maintenance men.

The Allen-Bradley Handy Catalog is an up-to-the-minute guide for efficient motor controls and accessories. Let us send you a copy of the latest edition. Write, today!

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BIRMINORAM — W. H. Bearen, 300 So. 23rd 51, Tek 7-5479
CHARLESTON — W. J. Hess, Room 302 Morrison Blog., 815 Quarrier St., Tek 2-3323

CHARLOTTE—Le Roy P. Spoon, 307 Lincoln St., Tel. 4-6334

DALLAS—L. K. Webb, 1814 Irwin-Knoster Bidg., Tel. 8.1034 16 5061

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HOUSTON—Wilson Electrical Equip. Co., 2930 Commerce Ave., Tel. Atwood 1557

JACKSONVILLE—Ward Engineering Co., Inc., 903 W. Adoms St., Tel. 4-6739

KARHSAS CIT?—B. L. MCCFCOT; & Son, 1817 Centric. Tel. Harrison 1668-9

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► USING OXYGEN OR ACETYLENE? Central station system oxygen and acetylene lines are being installed in several Houston area plants. Pipeline of the new Houston Oxygen Company's liquid oxygen—nitrogen plant supplies multiple industrial customers with oxygen. Individual cylinders are no longer handled, regulators and hoses no longer need to be switched from empty to full cylinders, and savings in labor costs are readily evident.

Company also has fleet of tank trucks to carry liquid oxygen under pressure direct to customer's permanently placed storage bank. Truck will tie a feed line into customers storage bank and by using an evaporator and pump to convert the liquid oxygen into dry oxygen gas right on the truck, customer's storage bank of tubes will be refilled.

Other customers will be set up with a liquid oxygen storage tank and a converter unit to generate dry oxygen gas on their own premises for use as needed. Thus, large batteries of steel cylinders or tubes, otherwise required, are eliminated.

THE SYNTHETIC FIBER INDUSTRY is almost exclusively a Southern industry. The area is the logical location — close to the basic petrochemical raw materials abundantly available and close to finishing mills where 80 per cent of the cotton spindles are located and where many woolen mills are now locating.

At the present time, the synthetic fiber industry exceeds all other branches of the chemical industry in rapidity of growth and possibilities for the future. Production is in excess of \$1 billion and plant investments in about the same amount. Raw materials purchases amount to \$500 million per year, and the yearly payroll is in excess of \$250 million.

THE SOUTHEAST'S LARGEST ELECTRIC FURNACE — a 60 ton unit — is now scheduled for operation at the Atlantic Steel Company, Atlanta, Georgia. Installation will increase the company's output of steel ingots by 50 per cent, resulting in a corresponding increase in the production of steel products bearing the familiar name DIXISTEEL. New, ultra-modern furnace, plus present three 75 ton open hearth furnaces, will produce more than 300,000 tons of steel ingots in

The 60 ton unit makes a heat of steel in about 4 hours, compared to 8 hours or more for an open hearth furnace. Unit can be fully charged in less than 30 minutes, or 7 times as rapidly as an open hearth furnace of the same capacity. It requires no pig iron for producing low-carbon steel, using scrap alone without impairing quality. The electric furnace can also produce high-carbon, special strength alloy steels, including stainless.

► WHAT'S NEW IN PRODUCTION METHODS was the primary concern of those attending the A.S.T.E. Show in Chicago, but they were still interested in some of the old and simple things — like BOLTS AND NUTS. A paper, presented by John S. Davey of Birdsall & Ward Bolt & Nut Company, dealt with how to tighten bolts and nuts and what happens if you don't.

A nut won't carry the lead it is designed to carry if it isn't tight. A truck frame manufacturer was bolting frames together with big 5/8 in. diameter bolts to be sure the frame was sufficiently strong. A slight, 150 lb, man with an 8 in. brace wrench was inspecting the nuts for tightness. Actually he had only enough strength to tighten a 1/2 in. bolt. The company was thus wasting money buying 5/8 in. bolts and the frames were weaker than if 1/2 in. bolts had been used. Davey recommended the use of mechanical or power wrenches that uniformly tighten nuts on bolts to preset values.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY 806 Peachtree St., N.E. Atlanta 5, Ga.

non-stop filtration with ADAMS PORO-STONE TEAM

 Whether you choose the open filter aid precoat tank or the closed filter aid precoat system, the Adams Poro-Stone team takes your process liquids ground the clock—week in and week out.

Complete package installations, ready to go on stream virtually at delivery, allow one filter to be drained, flushed clean, and precoated while the balance of the battery is in continuous service.

If cleaning or replacing clogged filter media stands in the way of making your process continuous, investigate Adams Poro-Stone CVF filters. They are available, with or without davit and swing bolts, in capacities and materials to suit most needs.

Bulletin 430 illustrates both manual and automatic operation.



247 E. PARK DRIVE, BUFFALO 17, N. Y.

R. P. ADAMS CO., INC.

NEW EQUIPMENT for Southern Industry

Free additional information is available to readers of Southern Power & Industry. Check item number on the postage free service coupon post card—page 17.

Air Break Switch

G-1 SOUTHERN STATES EQUIPMENT CORPORATION, Hampton, Georgia, is now manufacturing the type WAG air break switch in 196 kv and 230 kv ratings, available with or without grading rings, as required.

The Type WAG is a high pressure, vertical break, three insulator switch with center insulator rotating. Designed for sectionalizing, main line disconnecting and by-passing service, it is suitable for use in substations, on transmission lines and feeders.

The switch is available for horizontal upright, vertical or inverted mounting positions, and can be supplied for either right or left hand operation. It is available in all standard NEMA ratings from 7.5 kv through 230 kv, and in current ratings from 400 to 4000 amperes.

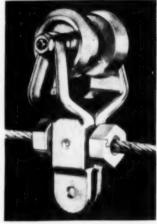
Cable Conveying System

G-2

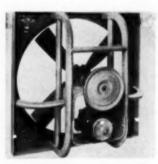
DAIGLE-GABOURY, INC.,
20175 Johnr, Detroit 3,
Mich., announce their D-G
Cable Conveyor System consisting of
9/16 in. steel core cable, split retaining nut, and split trolley bracket.

The special split retaining nut design makes possible the use of light 9/16 in. steel core cable as a connecting medium between trolleys in overhead conveyor systems performing heavy duty service.

Cable passes through "sleeves" of the "split" bracket. Sleeves have internal serrations. Nut exerts a 360 degree compression on the "sleeve" causing it to establish a biting hold on cable. Manufacturer claims that trolley brackets withstood "pull loads" up to 10,000 lb without indications of slipping.



The Daigle-Gabousy designed retaining nut makes possible use of 9/16 in. steel core cable as connection medium between trolleys in overhead conveyor systems performing heavy duty service.



Belt driven ventilating and exhaust fan of Chelsea available in sizes from 24 to 48 in. and air deliveries from 5,000 to 28,000 cfm.

Threadless Fittings

G-3

TEXAS LAWN SPRINKLER
Co., INC., 5422 Redfield St.,
Dallas, Texas, is marketing
under the trade name "Telsco" a complete new line of malleable iron
threadless fittings for joining standard-size plastic or steel pipe.

Fittings available are couplings, adapters, 90 degree elbows, adapter elbows, tees (straight and reducing), tees (with threaded branches), and reducers and increasers.

Fittings are factory-assembled and ready to use on plain-end pipe, with-

out threading. Pipe end is simply inserted into fitting, and fitting end nutstightened with an ordinary wrench.

Besides eliminating the time and labor of threading, the fittings produce a stronger connection because pipe wall is not weakened by threading. Rubber gaskets inside the fittings protect pipe from the strains of contraction, expansion and vibration. Fittings hold joint permanently tight, are not affected by the properties of air, water, gas, gasoline, butane or propane, and will withstand temperatures of from 250F to 275F.

Size range of malleable iron Telsco threadless fittings for joining standard size plastic or steel pipe is from θ_2 through 2 in.



Heavy Duty Fan

G-4

Co., INC., 639 South Ave., Plainfield, N. J., has introduced a new heavy duty belt driven fan for industrial applications, duct work, mine exhaust systems, and filtering units, where large volume of air is required under static pressure.

The fan is equipped with non-overloading cast aluminum airfoil type propellers. These units are completely ball bearing and motors are totally enclosed.

(Continued on page 10)

The Largest Demineralizer USED IN A PUBLIC UTILITY CENTRAL STATION IS A GRAVER

Exhaustive studies by the Philadelphia Electric Co. Engineers of all water purifying methods and equipment designs led to the selection of a Graver Demineralizing plant for the Schuylkill Station.

The requirements boiler feed make-up 1250 gpm for 1250 psig boilers.

The purpose . . . to supply heating needs in downtown Philadelphia, serving 600,000 lb per hr make-up to high pressure boilers and topping turbines.

The Graver plant has been in operation since late 1950. Typical of Graver performance and guarantees are the following results:

> Graver Graver **Guarantee Performance**

Dissolved Solids, ppm 220 less than 8 1.5-2.0 Silica, ppm 13 less than 0.3 0-0.2

Doing better than expected is a Graver habit...demonstrated by all types and sizes of Graver Water treatment plants. To make sure that you have "better than expected" results, consult Graver about your water problem.

For complete description of this demineralizing plant, write for free technical article "Boiler Feedwater technical Treatment for a High-Pressure, High Make-up Power



GRAVER WATER CONDITIONING CO.

Division of Graver Tank & Mfg. Co., Inc.

DEPT. SPI-D, 216 WEST 14TH STREET, NEW YORK 11, N. Y.



Free additional information is available to readers of Southern Power & Industry. Check item number on the postage free service coupon post card—page 17.

new equipment (continued)



Typical application of the Dodge Manulacturing Corporation's higher capacity shaft-mounted speed reducer. Shown mounted on shaft of the solid steel head-pulley of a sand belt conveyor is a Dodge No. 7 Torque-Arm Speed Reducer with horsepower capacity to 43. Anchoring arm is equipped with the Dodge Tri-Matic overload release.

Shaft-Mounted Speed Reducer

G-5

DODGE MANUFACTURING
CORPORATION, Mishawakn,
Indiana, has announced a
new double reduction shaft-mounted
speed reducer with capacity to 43 hp,
and for output speeds from 12 to 110
rpm.

Like previously announced models the No. 7 is shaft-mounted and anchored with a torque-arm which fastens to any fixed object. A turnbuckle enables fast, easy adjustment of belt tension. Installation is simple and economical. There is no foundation to provide; no flexible couplings are needed.

The new reducer brings the number of sizes in the Dodge Torque-Arm line to eleven—divided in two series single and double reduction—with capacities from 1 hp to 43 hp, output speeds from 12 to 330 rpm. The new Tri-Matic Overload Release is applicable to the No. 7, as it is to all models in the Dodge Torque-Arm line.

Insulation Test Unit

G-6

THE JOHN HEWSON COMPANY, 106 Water St., New
York 5, N. Y., announces
the availability of the Takk high voltage d-c insulation tester.

Instrument employs cold cathode diode type rectifier tubes, requiring no filament warm-up time. Hence measurements can be made instantly after connecting unit to insulation under test.

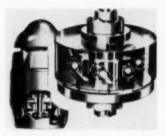
The Takk line is completely integrated and includes testers for operation at from 500 volts d-c to 75,000 volts d-c. Portable units as well as larger units for bench work and test table systems are available.

New Roller Chain Fasteners

G-7

MORSE CHAIN COMPANY,
Division of Borg-Warner
Industries, 7601 Central
Ave., Detroit 10, Mich., has announced
use of "Rollpins," new roller chain
fasteners.

The Rollpin is a chamfered-end, slotted steel cylinder that compresses easily into a pin hole smaller than its own diameter, expands and locks in place until deliberately removed by hammer and punch, and it may be re-used. According to the manufacturer, it is equal in shear strength to cold rolled pins of the same diameter, and it can't fatigue out even under the most severe working conditions.



To prevent reversal or back-spin of pump when power shuts off, U. S. Electrical Motors have developed this Ballomatic backstop.

Vertical Motor Backstops

G-8

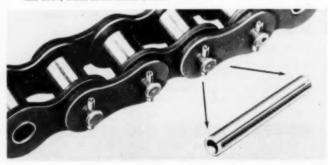
U. S. ELECTRICAL MOTORS
INC., 200 East Slauson Ave.,
Los Angeles 54, Calif., have
developed a new method of preventing
reversal of vertical hollowshaft

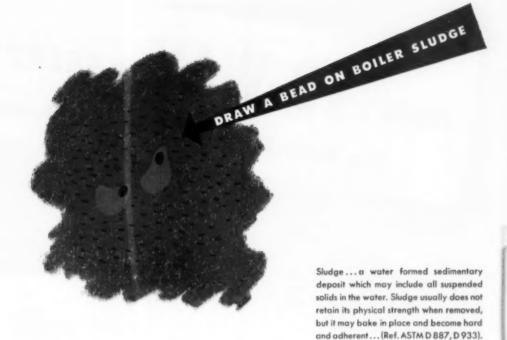
When electric motor current ceases, a vertical turbine water pump backspins unless means are provided to prevent motor reversal and avoid damage to pump bearings.

By using balls, the geometric form most ideally suited to provide quick engagement and maximum strength, U. S. Ballomatic-a backstop that depends on natural laws to give quickacting, dependable service, has been designed. When the motor starts, centrifugal force throws the hardened steel balls out of engagement with the stationary member. When the motor stops, gavity pulls the balls down and one of them engages between the rotating member and the stationary ratchet, thus preventing reversal. The backstop is designed with a different number of balls and ratchet flutes which multiplies the possible number of locking positions in one rotation.

(Continued on page 134)

Rollpins are now available on most of the larger pitches of both standard and heavy-series Morse Roller Chains.





Use DREW POWER CHEMICALS

Tube failure, expense and inconvenience... even plant shut down ... frequently results from baked-on sludge. Sludge often resembles scale and frequently causes the same troubles. It's the function of every good boiler water treatment to prevent the adherence of sludge as well as scale.

So we say, "Draw a Bead on Boiler Sludge, Mr. Engineer." Call in the Drew engineer. The water samples and operating data that he obtains in your plant will be thoroughly analyzed in the Drew Laboratories, and you'll be given specific recommendations for corrective Drew treatment. Furthermore, your Drew engineer will give you frequent and continuous help in your plant.

Thorough investigation, proper treatment, and frequent service have made Drew one of America's fastest growing water treatment companies. Consult the nearest Drewengineer or write for information.

Power Chemicals Division

E. F. DREW & CO., INC.

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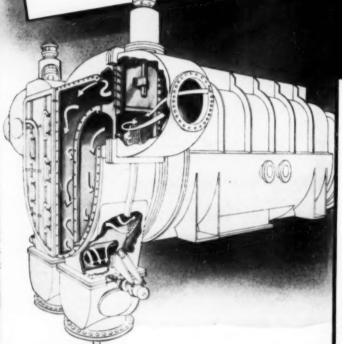
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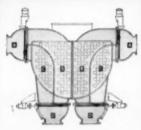
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with lower port open. It flows through
pass "C" to end of condenser, back
through "S" "B" and out through left
Left side: flow is reversed. Valves as
inlest "A" and discharge "D" are changed
to permit water to flow through "B" and
back through "C" in the opposite direction and then out through the left port
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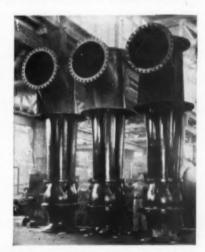
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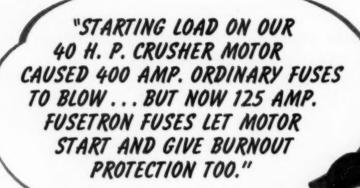
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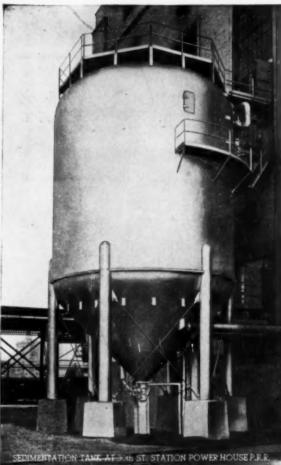
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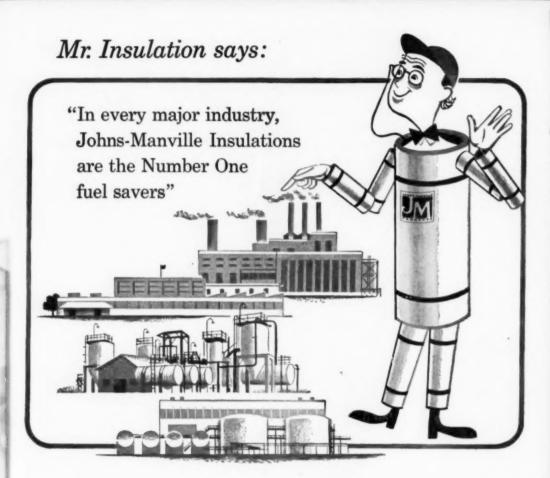


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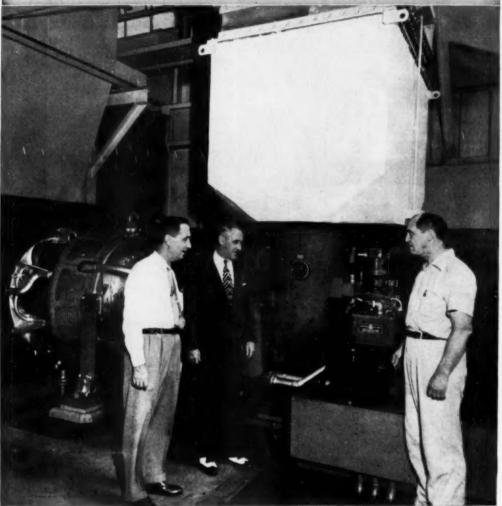
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Willis (extreme left) Superintendent of Generation at O.G. & E. and G. D. Conley (extreme right), Chief Engineer at Belle Isle Station.

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"Surpassed Expectations" says Donald S. Kennedy, President of Oklahoma Gas and Electric.

The first combustion-gas-turbine to be placed in commercial service in America continues its record of successful operation at the Belle Isle Station of the Oklahoma Gas and Electric Company. On the line since July 29, 1949, the 3500 kw unit has established a record which has surpassed contract commitments for both capacity and economy.

Donald S. Kennedy, President of the Oklahoma Gas and Electric Company, hailed the unit as eminently successful. "The combustion-gas-turbine at Belle Isle has been easily operated and maintained by our regular plant personnel. Maintenance costs have been lower and kilowatt output higher than we had anticipated. The output has averaged well over 100 per cent. Availability has been consistently high with only thirty-seven hours forced outage, due largely to the failure of a lube oil pump impeller. For availability, economy, and capacity, our gas-turbine has surpassed expectations."

General Electric combustion-gas-turbines are available in both 3500 kw and 5000 kw ratings. For complete details call your nearest G-E sales office or write for Bulletin GEA-5516, "Gas Turbine Power Plants."

General Electric Company, Schenectady 5, New York.

11,823-HOUR INSPECTION REVEALS EXCELLENT OPERATING CONDITION

A routine semi-annual inspection of the Belle Isle gas turbine was held in March, 1951. This careful check-up on all original parts failed to uncover any major components—either rotating or combustion—which required replacement.



This half-section of the second-stage nazzle diaphragm had undergone almost no deterioration in twenty months of service. Its condition, typical of all diaphragm pieces, warranted no maintenance.



All six combustion chamber caps were reinstalled for further service. The discolaration around the gas fuel nazzle of this cap is a deposit of noncombustible residue from the fuel.



The compressor rotor, shown here with the tap half of the casing removed, had collected a slight amount of dirt but was otherwise in original condition.

GENERAL



ELECTRIC

"BURNING COAL THE MODERN WAY CUT OUR POWER COSTS \$51,000 A YEAR!"

"Up-to-date coal installation cut fuel consumption 20.3%. labor force 47%!"



says Mr. George E. Bennett, Supt. Motive Power, Chicago & Eastern Illinois Railroad.

"We recently modernized the power plant at our Oakhawn Shops in Danville, Illinois. The savings we've realized in labor and fuel proved to us you can't beat bituminous coal burned with modern equipment."

This is a view of the firing aisle showing the spreader stokers which are fed by a weigh larry.



Here's the new power plant of the C&EI Railroad's Oaklawn Shops at Danville, Illinois. By burning coal the modern way this plant saves a total of \$51,150 a year—will pay for itself in less than seven years.



if you operate a steam plant, you can't afford to ignore these facts!

COAL in most places is today's lowest cost fuel.

COAL resources in America are adequate for all needs—for hundreds of years to come.

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

COAL prices will therefore remain the most stable of all fuels.

COAL is the safest fuel to store and use.

COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

BITUMINOUS COAL INSTITUTE

A Department of National Coal Association, Washington, D. C.

But you can get much more!

Low price—dependable supply—safe storage—

Get more steam for every dollar—burn coal in a modern combustion installation. Cut your labor costs—install automatic coal and ash handling equipment. If you call in a consulting engineer—he can show you how coal can do a better job for you with equipment designed to meet your specific needs.

Of all the fuels, coal alone has virtually inexhaustible reserves. And to supply this coal, America has the world's most productive and efficient coal industry. That's why you can count on coal for dependable supply, relatively more stable prices—now—and in the future, too!

YOU CAN COUNT ON COAL!



DIRECT BURIAL



OVERHEAD



IN DUCTS

Low-cost way to hit the **high** and **low** spots—use All-Purpose **DURASHEATH**

DURASHE DURASHEATH *can be used for every type of power and lighting application up to 15kv**. The most important fact about this all-purpose cable is that it may be run overhead, buried directly underground and run in ducts in one continuous length. Expensive splicing is avoided. Durasheath eliminates sheath electrolysis. It effectively resists condensation, weathering, sunlight, organic decay, abrasion and mechanical injury.

You can look for three definite savings with Durasheath. It costs less to install. It is flexible and light. It lasts longer. Its special neoprene jacket is tough enough to stand up to every natural enemy of cable life. It simplifies stock inventory. You need purchase only one cable—versatile Durasheath—to meet every electrical distribution requirement.

Ask your nearest Anaconda Sales Office or Distributor for the whole story on Durasheath. Then convince yourself how much you will save by using Durasheath. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

the right cable for the job ANACONDA

available in all sizesfrom large to small-single and multi-conductor.

for traffic control, airporthy power and lighting, mines, industrial plants, railroads, street lighting, and many other uses.



wire and cable

twhen ordered to CAA Specifications L-824,

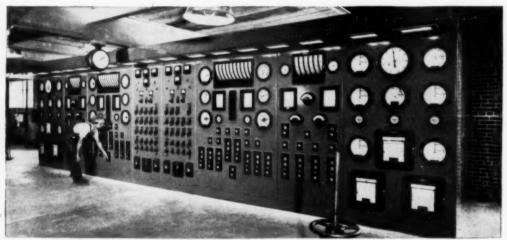
**for voltages over 5kv consultation with Anaconda Engineers is recommended.

REPUBLIC Combustion Control Systems

AN automatic combustion control system, as designed and built by Republic, will enable you to operate your boiler (or boilers) over a long period at test efficiencies regardless of variations in fuel, load and other operating factors.

Republic combustion control is a unified system controlling the fuel and air supply to the boiler in the correct amount to maintain constant steam pressure and in the correct ratio to maintain maximum combustion efficiency.

Republic automatic combustion control systems, either pneumatic or hydraulic, are available for all sizes of boilers, all types of fuel firing, and load conditions and any arrangement of draft equipment. They are completely described in Data Book No. S-21—write for your copy.



PULVERIZED COAL

In this modern central station steam is generated in two 600,000 lbs. per hr. pulverized coal fired boilers operated by a Republic Combustion Control System.

REPUBLIC FLOW METERS CO

2240 Diversey Parkway, Chicago 47, Illinois

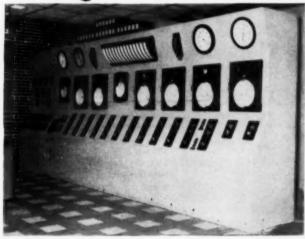
for

All Sizes of Boilers

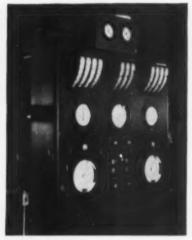
All Types of Firing

All Arrangements of Draft

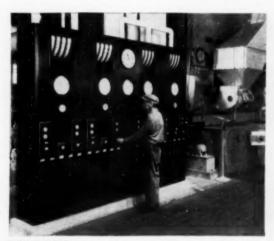
All Load Conditions



OIL FIRED
A typical Republic automatic boiler control and instrument installation in a large central station for the operation of a 450,000 lb. per hr. oil fired boiler.



MIXED GAS
Republic instrument and controls for two
50,000 lb. per hr. boilers burning mixed gas.



STOKER FIRED

The Republic combustion control and instrument panel for the automatic operation of four 80,000 lb. per hr. stoker fired boilers.



STOKER FIRED

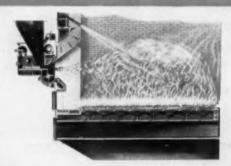
In this modern industrial plant steam is generated in a 175,000 lb. per hr. stoker fired boiler operated by a Republic control system.

ERIE CITY FOR YOUR SPECIFIC



"TRAVAGRATE"

In the "Travagrate," flexibility, to handle widely varying load demands, is combined with ruggedness. The Erie City "Triple Feeder" and distribution controls assure accurate fuel spreading over the moving grate. Our latest bulletin, which is offered in the convenient coupon below, shows in detail these and many other features.



DUMPING GRATE

The Erie City Dumping Grate Spreader uses the same "Triple Feeder" and Fuel Distribution system as the "Travagrate." All stoker parts exposed to furnace heat are made from a special heat resisting alloy iron in our own foundry. When required, parts of Erie City Spreader Stokers exposed to furnace heat are air and water cooled.

UNDERFEED RAM TYPE SIDE DUMP STOKER

There is an Erie City Single-Retort Underfeed Stoker for practically every type of boiler to handle steam loads up to 700 developed boiler horsepower. These stokers are furnished in low-set and heavy-duty models. Our bulletin gives details and illustrates various applications.



ERIE CITY IRON WORKS

STEAM GENERATORS . SUPERHEATERS . ECONOMIZERS . AIR PREHEATERS

UNDERFEED and SPREADER STOKERS . PULVERIZERS

STOKERS

CONTINUOUS ASH DISCHARGE SPREADERS



The Erie City Hydraulic Drive unit is completely housed in an oiltight unit without external piping. The fluid drive transmits power to the main shaft through a linkage and ratchet gear. A single control valve regulates grate speed.



TYPE SPREADER STOKERS



Grate units are interchangeable and easy to remove or replace. The bulletin offered below fully describes how dumping grates are connected to dumping bars which are actuated for ash disposal by power cylinders — either steam or air powered. A 4-way hand operated valve is located on the lower front to the right of each ash door.



You can study the design and construction of Erie City Stokers by simply filling in the handy coupon below. As a designer and manufacturer of dependable steam generating equipment for over 112 years, we believe you will discover that Erie Stokers reflect this experience. If you use coal we want you to know Erie City Stokers regardless of whether you plan new power, process, or heating installations. These stokers were designed to meet the exacting needs of industry in the efficient production of steam. If you wish to consult with an Erie City engineer or obtain copies of our stoker literature, let us know by mailing the coupon below.

ERIE CITY IRON WORKS

Gentlemen:

- We are interested in seeing your stoker bulletin: Underfeed Spreader.
- We would like to discuss Stokers with an Erie City engineer.

NAME

TITLE___

COMPANY

CITY_

STATE









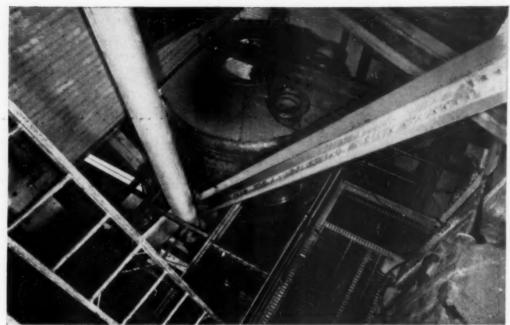




NATIONAL TUBE DIVISION

UNITED STATES STEEL COMPANY, PITTSBURGH, PA.

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS - UNITED STATES STEEL EXPORT COMPANY, NEW YORK



STAINLESS STEEL DEAERATING TANK is hoisted in place during construction of one of Detroit Edison Company's Heating Plants at Detroit, Michigan.

When CO₂ Caused a Headache .Worthington Cured It

Detroit Edison had the solution to its problem -the problem of CO2 in its steam-except for one thing.

Zeolite-softened municipal water used in their steam plant contains high percentages of carbonates which decompose and generate CO2 in the boilers. Carried over with the steam into heating and processing equipment, that CO2 could cause plenty of trouble.

The CO2 problem was solved by Detroit Edison engineers by acid treating the softened water, converting the carbonates to CO2. The gas thus formed is driven off in a deaerator.

However, no standard deaerator could successfully remove the large quantities of CO2 released by the acid treatment, and deliver water to the boiler with practically zero oxygen and zero CO2. Furthermore, standard materials would have lasted only a few months under such conditions.

NON-CONTAMINATED STEAM

Worthington provided the answer. Detroit Edison engineers selected a Worthington deaerator specially designed for these severe conditions, built entirely of stainless steel, and guaranteed to deliver water containing not over 0.005 ppm of oxygen and not over 0.1 ppm of CO2. The result is steam containing so little CO2 that the amount cannot be accurately measured!

On problems like this one, Worthington not only furnishes all of the equipment needed in a complete water treating installation, but also has the engineering ability to work with your engineers on the complete problem of generating steam for power or processing. For further information on why there's more worth in Worthington, address Worthington Corporation, formerly Worthington Pump and Machinery Corporation, Steam Power Division, Harrison, New Jersey.





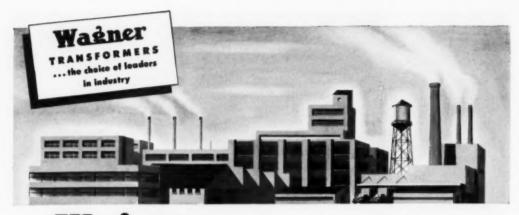






A GREAT TEAM IN STEAM

Feedwater Heaters



Wagner Dry-Type Transformers safe, efficient power distribution for your plant

Wagner Dry-Type Transformers are the answer to the problem of bringing the right voltage to load centers economically—yet with complete safety and dependability.

They can be used for a variety of purposes, such as insulating a lighting circuit from a power circuit, obtaining a 240/120 volt 3-wire circuit from a 2-wire system, operating low-voltage portable lamps, and supplying machine tool lighting from the power circuit. They are frequently used to step down power distributed at 480 or 600-volts to supply lights, portable tools and other 120-volt devices.

Wagner Dry-Type Transformers are economical—they eliminate long runs of secondary copper... they provide steady voltage with minimum line losses... they are light in weight and compact—inexpensive to install and easy to move if changes in plant facilities make it desirable.

They are safe to use—without fireproof vaults or other special protection—even where fire hazards are present.

Wagner general-purpose dry-type transformers are available in single-phase, two coil units (Type AE) in sizes 1.0 to 200 kva, 600 volts and below; and in three-phase, two coil units (Type AP) in sizes 3.0 to 300 kva, 600 volts and below. Type AA Auto-transformers are also available. Write for a copy of Bulletin TU-90. It gives many suggestions that you can use.

Thirty-two branches, located in principal cities, are at your service for consultation on transformer problems.



TYPE AE

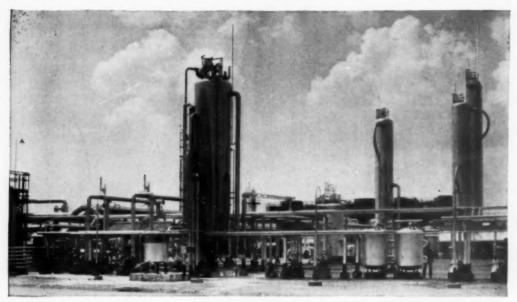


WAGNER ELECTRIC CORPORATION 6383 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS - TRANSFORMERS - INDUSTRIAL BRAKES AUTOMOTIVE RRAKE SYSTEMS - AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES





NORTH COWDEN GASOLINE PLANT near Odessa, Texas, operated by Stanolind Oil and Gas Company. Here Worthington Water Softeners protect boilers

Worthington softeners protect this plant's boilers 10 ways

In this case, it's a hot-process softener to remove scale-forming deposits from boiler feedwater.

Let's examine this gasoline plant installation and see how it gives boilers "maximum" protection:

- 1. Feed water is softened by a hot-lime soda system.
- 2. Selective deaeration for operation on makeup only, condensate only, or both.
- 3. Non-scaling direct-contact vent condenser heats and vents treated make-up.
- 4. Tubular vent condenser vents condensate.
- 5. Oxygen contamination of feedwater avoided by last-step deaeration.
- 6. Stainless steel deaerating elements.

- 7. Uniform and efficient deaeration during wide load swings.
- 8. Filter backwashing with clean, hot, chemically inert water without velocity change through the softening zone.
- 9. Proportionate sludge removal.
- 10. Uniformly proportionate chemical feed.

Before you buy, investigate Worthington Water Softening Systems thoroughly. Tell us the service conditions, and get our recommendations in terms of dollars and benefits. Write Worthington Corporation, formerly Worthington Pump and Machinery Corporation, Water Treating Section, Harrison, N. J.











Water Conditioning

Warthington Makes More of the Equipment for ALL Types of Water Conditioning Systems



Every Man, Woman and Child in the U.S.A. Can Go Riding at the Same Time

Is the U.S.A., competition is basically responsible for better cars at lower comparative cost. We enjoy the use of three times as many cars—and annually produce four times as many cars—as the rest of the world put together. There are approximately 43 million autos—and 9 million trucks and buses—in use in the U.S.A. today. That's more than enough to take everyone riding at the same time.

By stimulating the sale of the new and the resale of the old, our competitive system achieves widespread ownership of automobiles, as with almost everything else. In most foreign countries, out of necessity people make things last as long as possible. In the U. S. A., vigorous competition prompts improvement, refinement and continuous progress. Buyers of new cars get maximum value, because each manufacturer competes actively for the new-car dollar. Lowest-income groups benefit by the lowered prices of used, yet essentially useful, products. Overall result: Steady jobs, good wages and the world's highest standard of living. In most of the rest of the world, luxuries come within reach of only the rich. In the United States, the irresistible drive of competition invents, mass-produces, advertises, distributes and sells—so that most of the miraculous products of modern living are within the reach of all.

Free competition—like freedom of speech, press and religion—is a dynamic part of Uncle Sam's character. Let's keep it free, so that the U. S. A. continues to be the greatest country in the world.

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In twenty-three principal cities in the U. S. and in several industrial centers outside the country there is a Wickes sales engineer—who really knows boilers—ready to help you. This widespread sales organization, alone, helps greatly to increase the service you get from Wickes, and once you place an order for a Wickes boiler, Wickes engineers and production men get into production without delay. Wickes knows that when you want steam generating equipment, you want it. A Wickes installation is a complete installation. One contract

covers all controls, all accessories, all engineering, all work from original survey to final brick-work and installation ready-to-go. r r Throughout the world, industries and institutions that depend on steam have learned to depend on Wickes for efficient, low cost steam power. Wickes can fill your requirements for steam generating equipment up to 250,000 lbs. per hour and 1000 psi.—all types of multiple drum boilers adaptable to any standard method of firing. Write today for complete information or consult a Wickes sales engineer.

OF THE WICKES CORPORATION, SAGINAW, MICHIGAN



WICKES

THE WICKES BOILER COMPANY

SALES OFFICES: Atlanta * Boston * Buffolo * Chicago * Cincinnati * Cleveland * Denver * Detroit * Greensbore, N.C. * Houston * Indianapolis * Los Angeles * Memphis * Milwaukee * New York City * Pittsburgh * Portland, Ore. * Saginaw * San Francisco * Springfield, III. * Tampa, Fla. * Tulso * Washington, D.C.

141

RECOGNIZED QUALITY SINCE 1854



• Yes, if you are operating a supercharged Cooper-Bessemer diesel, you're in line for Cooper-Bessemer aftercooling — a sure-fire way to increase your horsepower approximately 15%.

It involves only a simple, surprisingly inexpensive modification. No change in engine speed, space requirements, jacket water cooling system or overload capacity. The aftercooler is readily inserted between the supercharger and intake manifold. Here the combustion air is watercooled, resulting in greater power and higher combustion efficiency.

If you can use additional power to advantage, here's a simple, inexpensive way to get it — another typical example of progressive engineering at Cooper-Bessemer. Why not talk it over with our nearest office?

New York Washington, D. C. Bradford, Pa. San Francisco Houston,
Dallas, Greggton, Pampa and Odessa, Texas Seattle Tulsa Shreveport
St. Leuis Los Angeles Chicage Caracas, Venezuela Cooper-Bessemer of
Canada, Ltd., Halifaz, Nova Scotia Gloucester, Mass. New Orleans, Le.

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Cooper-Bessemer
Corporation

MOUNT VERNON, OHIO - GROVE CITY, PENNA

These fellows like dirt



... how about your boilers?

Hogs thrive on dirt—dirt of any kind, wet or dry. But your boilers are different; they can't function at their best with coal that isn't properly cleaned and correctly sized for their particular requirements. And steam costs are bound to go up if you try to use coal that isn't right for your burning equipment.

More and more industrial buyers throughout the South are learning that Bell & Zoller's Superwashed ORIOLE is the right coal for their plants. A free burning, low ash, low moisture coal from West Kentucky, Superwashed ORIOLE is scientifically cleaned and correctly sized to meet the most rigid requirements. It's the outstanding performer among Bell & Zoller's selection of top-quality Western Kentucky coals.

If your boilers are "hogging" coal, and steam costs are a problem, call or write our nearest office. A combustion engineer will gladly inspect your burning equipment, analyze your requirements and determine the *right* coal for your needs—entirely without obligation.

Bell & Zoller Coal Company

BELL BUILDING, CHICAGO 1, ILLINOIS ST. LOUIS • NASHVILLE • OMARA • MINNEAPOLIS Sixty-Six Yours of Service to Coul Users Producers of ZEIGLER, MOSS HILL, ORIOLE, MURDOCK, and BUCKHORN Cools

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UNIBESTOS

REDUCES
HEAT-LOSS
AND
MAINTENANCE

Keeps Surface
Temperature
Low

YOUR
UNARCO
WAREHOUSING
DISTRIBUTOR
HAS UNIBESTOS
INSULATIONS
IN STOCK

From coast to coast, from north to south, Unibestos is winning new friends. First, because this quality product is so economical, efficient, long-lasting. Second, because—wherever you are—there's a reliable distributing organization ready to supply you from stock. For temperatures up to 1200° F., specify Unibestos No. 1200. Ask for Unibestos No. 750 when the temperature won't go over 750° F. And, for needs up to 600° F., you can get Unarco Amocel from these same Warehousing Distributors. Unibestos is made in cylinders, half-rounds, and blocks. If you don't know your nearest Unarco Distributor, we'll be glad to send you his name. Please ask us, too, for Bulletin 76-109.

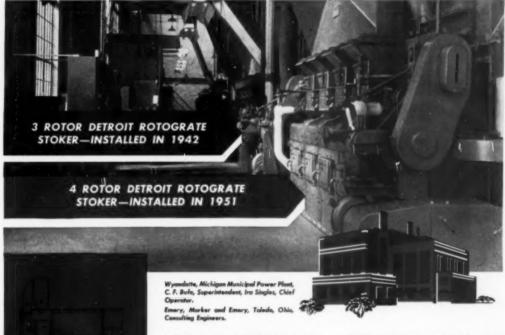
For further information write or call 333 Candler Building, Atlanta, Georgia. Telephone Lamar 7113



UNION ASBESTOS & RUBBER COMPANY

DEPT. F6, 332 SOUTH MICHIGAN AVENUE . CHICAGO 4, ILLINOIS

Detroit RotoGrate Stoker's ability to burn wartime coal <u>Brought Repeat Order-</u> Municipal Plant, Wyandotte, Michigan



In 1942, the Municipal Plant, Wyandotte, Michigan had coal trouble, as did most plants with old type firing equipment. It became almost impossible to operate on the coal they could get.

They purchased a Detroit RotoGrate, which solved their fuel problem immediately. The RotoGrate proved able to burn efficiently any coal available including the poor stuff which war conditions often forced them to use. In the fall

of 1951 when they expanded the plant the Detroit RotoGrate was again the stoker chosen.

Detroit RotoGrate is a modern type spreader stoker with grates that move slowly forward, discharging ash at the front. A RotoGrate installation makes it possible to buy the most economical coal, and burn it with highest economy.

Write for Bulletin.

DETROIT STOKER COMPANY

General Motors Bldg. WORKS AT MONROE, MICH. Detroit 2, Michigan District Offices in Principal Cities -it pays to be accurate!

WHETHER slicing apples, or slicing fuel costs in the boiler room, lack of accuracy means a loss. If the combustion control system in your boiler room is not precisely accurate, you lose—and the loss that goes up in smoke can be more than you'd think.

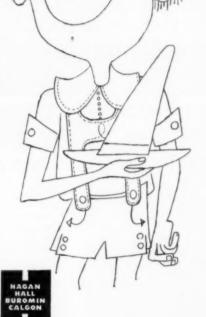
Look at it this way. A medium sized boiler could use \$10,000,000 worth of fuel in its normal operating life.

Now—if your combustion control system is not dependably accurate, that system would ultimately cost you five, six, or seven times its initial cost!

From this point of view, you cannot afford to buy anything less than the best—anything less than a Hagan Combustion Control System.

Our engineers will be glad to discuss what the Hagan Combustion Control System can do for you.

For more information, write, wire or phone:



HAGAN CORPORATION

HAGAN BUILDING, PITTSBURGH 30, PA.

BOILER COMBUSTION CONTROL SYSTEMS
RING BALANCE FLOW AND PRESSURE INSTRUMENTS
METALLURGICAL FURNACE CONTROL SYSTEMS
THRUSTORD FORCE MEASURING DEVICES



"Whirlex" multi-tube cyclone dust and fly-ash collectors are efficient, compact and versatile. They are highly efficient in collecting dust in the lower micron ranges with almost total removal of solids above 325 mesh. The compact cyclone tube units may be grouped in a wide variety of arrangements to permit installations in crowded locations. Gas inlets and outlets may be located in side or top of collectors and angle types are also available. The Fly Ash

Arrestor Corporation manufactures a complete line of low draft loss collectors for installation in stacks and ducts. Highly efficient induced draft fans are made to order together with constant ratio dampers, fly ash injection systems, and overfire air systems. Stacks and necessary connecting duct work are made of heavy welded steel. Proper vaning is provided to reduce turbulance in ductwork. Write for detailed literature and address of your nearest representative.

THE FLY ASH ARRESTOR CORPORATION BIRMINGHAM ALABAMA

274 North First Street

Telephone 54-6676



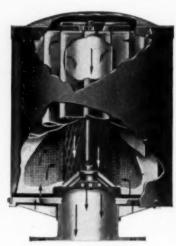
STAYNEW INTAKE FILTERS

They give us positive protection . . . They won't need regularly scheduled maintenance . . . They're easy to clean on the job . . . Efficient over a wide range of loads They're not affected by temperature change . . .

There's no oil carry-over
OUR EQUIPMENT WILL LAST LONGER!"



Industrial engineers everywhere know that Staynew's Positive Protection lengthens equipment life. From compressors to generators . . . from blowers to internal combustion engines, Staynew Intake Filters stop dust and dirt from entering through air intakes, causing carbon accumulation and needless wear. And Staynew Filters frequently operate two or more years without maintenance. When cleaning is indicated, a brush or simple vacuum cleaning insert is all you need. Specify Staynew and increase productive time. Write for Complete Booklet on Staynew Intake Filters.



MODEL D

Representatives in Principal Cities



DOLLINGER
CORPORATION
40 Centre Pk., Rochester 3, N. Y.

ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED



OUT IN THE YARDS — with their sleeves rolled up. That's where you'll find our new Assistant Vice President, Yards and Terminals, and his newly-created "task force" of terminal trouble shooters.

An innovation in railroad circles, this "task force" is actually living in the yards day and night—studying every operation—seeking new ways, no matter how small, to improve our service.

In recent years, we have invested \$120 million in Diesel locomotives. In recent months, we have been modernizing existing yards and building new ones at a cost of \$17 million.

"Operation Shirt-Sleeves" is one of many reasons why these expensive new transportation "tools" on the Southern will result in better, ever-improving service for customers of the railway that "serves the South,"

Herry s. Distalle

SOUTHERN RAILWAY SYSTEM

WASHINGTON D. C.





Vertical adjustment up to $2\frac{1}{2}$ inches can be made.

Insulated

Support may be turned to any angle of 360°.

Will take care of 8 inches of travel.

Features

Universal Pipe Supports hold the pipe down as well as up. They prevent pipe from getting out of alignment, which is usual when Roller Supports are used.

They permit control of expansion movement and insure the desired free action of Slip Expansion Joints so essential in tunnel and duct work.

Expansion movement of pipe will not disturb the insulation.

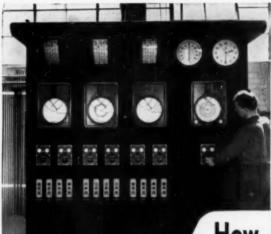
Made in Cast Iron or Steel and provided with forced lubrication for lines exposed to the weather.



MAUCO DIDING

NATIONAL VALVE & MANUFACTURING COMPANY - PITTSBURGH, PA.

NEW YORK . CHICAGO . CIEVEIAND . EUSTON . ADIANTA . TOISA . EUFFAIO . CINCINNALL



These Bailey Boiler Controls at the Chicago Pneumatic Tool Company's new plant in Utica, N. Y. Insure efficient operation of three 25,000 lb per hour, 100 psi, spreader stoker-fired boilers

How to INCREASE the Efficiency of YOUR BOILER-ROOM DOLLAR

Before you get steam you've got to spend dollars—so dollars are a form of energy.

And if your boiler-room dollars are invested in equipment that isn't working efficiently, economically, your "investment" is poor.

That's where co-ordinated controls by Bailey can help. Here's why they'll increase your "boiler-room investment efficiency":

- Complete Range of Equipment—fully co-ordinated. You need never worry that a Bailey Engineer's recommendation is slanted in favor of a particular type of equipment, just because be has a limited line to sell—or that Bailey will pass the buck for efficient control; we offer complete boiler control systems.
- Engineering Service—backed by experience. No other manufacturer of instruments and controls can offer as broad an experience, based on successful installations involving all types of combustion, flow measurement and automatic control.
- 3. Direct Sales-Service conveniently located near you. Bailey Meter Company's sales-service engineers are located in more

industrial centers than those of any other manufacturer of boiler control systems; you get prompt, experienced service with a minimum of travel time and expense.

For better "boiler-room investment" efficiency—for more power per fuel dollar, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey engineer to arrange a visit to a nearby Bailey installation. We're proud to stand on our record: "More power to you!"

A-111-0



1028 IVANHOE ROAD CLEVELAND 10, OHIO

Controls COMMUNICAN - FEED WATER THATES COMMUNICAN - FEED WATER THATES - PASSIBLE THATES THAT



- LOW COST
- COMPACT

Built-in standard motor — no separate gearbox or couplings.
Built-in oil-enclosed gear reducer.

- MICRO-STROKE ADJUSTMENT
 Scale easily read crank and connecting
 rod operate in horizontal plane.
- LONG LIFE AND EASY MAINTENANCE One-piece Meehanite iron frame for positive alignment of all moving parts. Double check valves on suction and discharge easily removable.

This new, compact chemical feed pump, by %Proportioneers, Inc.%, is inexpensive and provides accurate boiler water treatment for plants where a low capacity, medium pressure pump will meet requirements. The standard Model X 52 has a capacity range from 1 to 10 GPH and will discharge against pressures up to 650 psig. For lower feeds, the unit is available with a range of from 0.5 to 5 GPH. Complete and self-contained, Model X 52 weighs less than 100 lbs. and is ready to operate as soon as piping and motor are connected.

Ask for Bulletin 1105



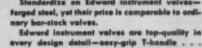
Write to %PROPORTIONEERS, INC.%, 393 Harris Ave., Providence 1, R. I.

Technical service representatives in principal cities of the United States, Canada, Mexico and other foreign countries.

ALL FORGED STEEL

Edward INSTRUMENT VALVES

Lowest Cost Valves for Their Rating!



Edward instrument valves are top-quality in every design detail—easy-grip T-handle . . . brenze yeke bushing . . . ferged steel ene-piece outside screw yoke . . . forged steel corresion-resistant EValized packing gland . . . EValloy 13% chromium stainless steel stem-disk with needle point for cless flow control . , . forged steel EValized gland belts that swing out of the way for easy repocking . . . heat resistant die molded EValpak packing.

And look at this versatility-

* STEAM, WATER, OIL or GAS PRODUCT PROCESS LINES

Edward instrument valves At Into any piping system. Globe or angle, sizes 16", 16", 16", 36" and 1".

* HIGH TEMPERATURES OF HIGH PRESSURES

Rated up to 6000 fb at atmospheric temperatures, or up to 1500 fb at 1000 F.

* STANDARD or CORROSIVE SERVICE

Available in cerbon sizel or 13% shremlum bodies and trim.

* TYPICAL USES

Orifice Maters Instrument Panels Oil Field Xmas Trees Hydraulic Systems Vant Lines Engulators Oage Lines Orte and Orein Lines Pressure Encardors Compsive Lines

Out the full story on Edward instrument valvas—the lowest cost valvas for their radius. Write for Bulletin 491.

Edward Valves, Inc.

Subsidiary of ROCKWELL MANUFACTURING COMPANY EAST CHICAGO, INDIANA

Another (F



First FROM PEERLESS

A HEAVY DUTY REFINERY & CHEMICAL PROCESS PUMP DESIGNED WITH AND FOR A MECHANICAL SHAFT SEAL

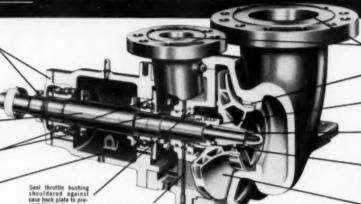
Slinger and special recessed bearing cap provide an effective seal without wearing parts.

Heavy duty thrust and radial bearings oillubricated

Precision alloy stee heat treated, shaft.

Slinger and special recessed bearing cap provide an effective seal without wearing parts.

Extra large capacity oil



Top suction and top discharge design. Endsuction design avail-

Case and impeller wearing rings are spot

Mechanical shart seal

Lock washer secures her not on shaft.

> Seal sleeve keyed to shaft, gaskeled at shaft shoulder to prevent lookage under sleeve.

Enclosed type impeller is keyed to shaft; repelling vanes on back

PEERLESS PROCESS

The Peerless Type PRS pump is designed specifically for mechanical shaft seal construction. All the advantages of proved mechanical seals are inherent in the Type PRS pump design.

LONGER LIFE. Mechanical seal design permits use of short shaft. A shorter shaft means greater rigidity, less deflection, minimum run-out, less wear in bearings, wear rings, seal and moving parts.

2. GREATER SAFETY.
Throttle bushing is shouldered against case back plate from suction side; cannot blow out even under maximum operating pressure.

3. MORE ECONOMICAL. No premium is charged in first cost for the mechanical shaft seal construction of the Type PRS pump. Lower maintenance costs will be effected throughout its longer life.

4. AVAILABLE IN SEV-ERAL SIZES. Peerless Type PRS pumps are available for quick assembly and shipment from Peerless' Los Angeles stock in several sizes.

5. ENGINEERING CON-SULTATION SERVICE. Help on selection and application of the Type PRS pumps to your problems is available from the Peerless factory or the Peerless field engineer or distributor nearest you.



Characteristics AT A GLANCE

Capacities
Operating Heads
Case Pressures
Temperatures
Drives

up to 1000 gpm up to 625 feet up to 400 psig up to 250° F horizontal electric motor is standard; other types available as required.

APPLICATIONS

Use the Peerless Type PRS pump for handling all petroleum hydrocarbons, process liquids, water, hot oil, LP-gases. Liquid end can be furnished in material suitable to the intended service.

Dependable PUMPS



200

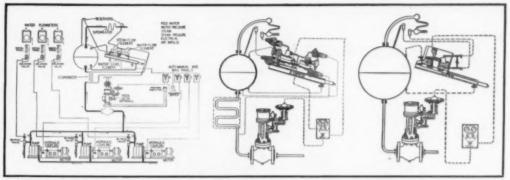
Write or wire today for further engineering information.

PEERLESS PUMP DIVISION

FOOD MACHINERY AND CHEMICAL CORPORATION

Address inquiries to Factories at:

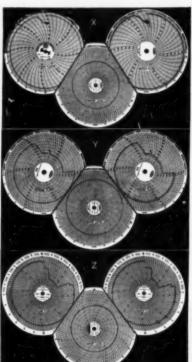
Les Angeles 31, California and Indianapelis 8, Indiana Offices: New York, Chicago, St. Leuis, Atlanta; Dallas, Piolaview and Lubbock, Texas; Fresno, Las Angeles; Phoenix, Albuquerque, N. M.; Tulsa



"A"—COPES Balanced Flow (3-influence) Control applied to hydraulic couplings of three pumps feeding boiler. Minimum Flow Control System also shown.

"B"—COPES Balanced Flow Regulator feeds boiler according to balanced influences of water level, steam flow and feed water flow.

"C"—COPES Flowmatic Regulator, air operated, actuated by water level and steam flow. Most modern design of the original 2-element control.

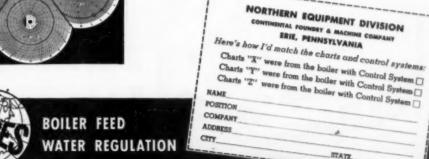


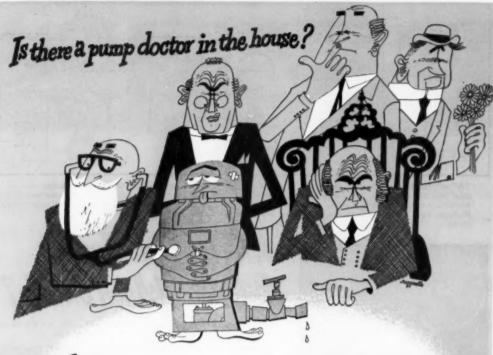
Which Control System Produced Which Charts?

- "X"—Steam-flow, water-flow and water-level charts for a C.E.S Steam Generator. Peak load capacity: 750,000 pounds per hour.
- "Y"—Corresponding charts for a Babcock & Wilcox Radiant Type Bailer.

 Peak load capacity: 425,000 pounds per hour.
- "Z"—Similar charts for a C-E-S Radiant-Type Steam Generator, Maximum evaporation: 1,150,000 pounds per hour.

Each of these three COPES Boiler Feed Control Systems is used in a different utility plant. Results with each system are shown by one set of charts. You'll find little difference in gearing of feed to steam output or water level stabilization, because COPES always designs for the individual operating conditions. The number of control influences is unimportant. Try matching Charts "X", "Y" and "Z" to the correct control systems—then mail the coupon. The first 25 to do so will receive a useful gift.

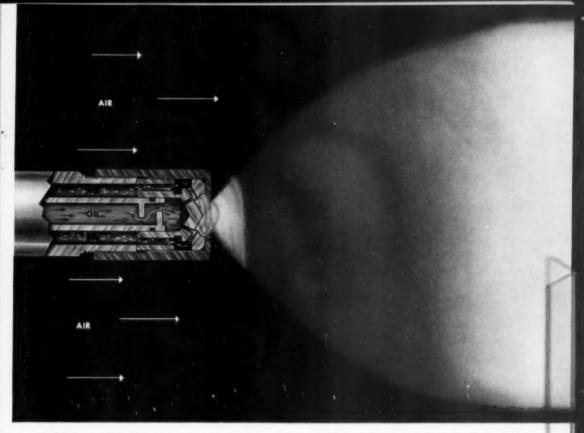




YES... THERE'S A BJ PUMP SPECIALIST A FEW MILES OR MINUTES FROM YOU!

If you have a sick pump—or if you're having trouble diagnosing a pumping problem, a BJ pump specialist can help. These fully-qualified BJ Sales Engineers, working out of 31 company sales offices, bring you the benefit of BJ's 80 years' experience in meeting and solving every kind of pumping problem. These local Byron Jackson offices are in addition to BJ's six modern factories, six service shops, and reliable dealers. For pump engineering assistance and quick answers to your particular pumping problems, just phone your nearby BJ Branch Sales Office!





NOW-only <u>Powermaster</u> gives you VORIFLOW combustion!

LATEST DEVELOPMENT IN BURNER DESIGN REDUCES COSTS AND INCREASES BOILER EFFICIENCY

Here's what Powermaster's new VORIFLOW burner will do for you:

 Saves fuel by providing infinitely variable combustion modulation in response to demand—with full efficiency through wide range from 30% to 100% of firing capacity.

This means elimination of waste and maintenance headaches because of incomplete combustion. With the exclusive design of the VORIFLOW burner, tiny jets of compressed air pulverize every droplet of oil . . . projecting a fine fog of oil/air emulsion into the combustion area where it ignites and burns —immediately and completely. The VORIFLOW burner does

away with outmoded mechanical spinning devices, globules of wasted oil, and gummy cleaning problems.

2. Slashes boiler maintenance costs.

There are no moving parts to wear out • There is no cup to clean daily. Routine cleaning of the burner once a month is sufficient • There is no burner vibration to throw adjustments "out of whack" • Parts are made of stainless steel, brass, and beryllium copper—they will last indefinitely.

 The combination burner permits rapid change-over from one fuel to another—light oil, heavy oil, or gas.

And when we say "rapid" we mean just that the job can be done in four minutes. Modulating firing controls are ready to go into action at the flick of a switch. It isn't necessary to change the entire burner assembly. All you need to do to fire gas is to remove the oil nozzle.





Before deciding on a boiler for your plant, be sure to get the facts on the newest POWERMASTER with VORIFLOW combustion. Write for this catalog that gives you the entire story of the Powermaster packaged automatic boiler. Just drop us a line and we'll put one in the mail for you.





THERE'S A tinental IDLER for every purpose



INDUSTRIAL DIVISION CONTINENTAL GIN COMPANY

BIRMINCHAM, ALABAMA

ENGINEERS



CCC ATLANTA . DALLAS . MEMPHIS . NEW YORK CCCC MANUFACTURERS



Million Pound Boiler at Sunbury Station of the Pennsylvania Power & Light Company

LJUNGSTRON AIR PREHEATER

The latest addition to the Pennsylvania Power & Light Company's new Sunbury Station is a unit that adds 125,000 kilowatts to this utility's power output and increases the Station's capacity to over 400,000 kilowatts. The station was designed by Ebasco Services, Inc. under the utility's supervision, and built by the latter.

The reheat boiler for this unit was furnished by Foster Wheeler Corporation. It is fired by pulverized coal and has a capacity of 1,000,000 pounds of steam per hour at 1525 pai and 1005 F., reheated to 1005 F. This Foster Wheeler boiler incorporates a Ljungstrom Air Preheater, which preheats combustion air to 543 F., and cools exit gas to 281 F.

Since the war, the total capacity of steam generating units equipped with Ljungstrom Air Preheaters — installed, under construction or on order in industrial and utility plants throughout the country — comes to well over 285,000,000 pounds of steam per hour. Every boiler manufacturer has included Ljungstrom Air Preheaters in prominent installations made during this period.

THE Air Preheater Corporation 60 East 42nd St., New York 17, N. Y.

If there's dust on it

it may be precious scrap!



SCRAPPY SAYS :

MORE STEEL

OMORROW

NON-FERROUS SCRAP

NEEDED, TOO!



it's needed to make STEEL!

One half of all the raw materials used in steel production is scrap.

Today, the mills aren't getting enough iron and steel scrap to keep up with greatly increased steel production.

AND WHAT IS SCRAP?

Scrap is many things. Here are three:

- the "left-overs" of iron and steel production, fabrication and machining.
- 2. junked autos and old farm machinery.
- obsolete iron and steel equipment in factories, such as old machinery, tools, dies, jigs, fixtures, chain, valves, etc.

But—the "left-overs" are not great enough today to fill the unprecedented demands for steel production. And, with replacements scarce, less junked autos and farm machinery have entered the scrap supply lines.

So—only by digging out all the neverto-be-used odds and ends of broken, worn-out, and obsolete factory equipment . . . can mills and foundries get all the scrap they need.

If they don't get it, steel production rates may be severely hampered . . . and our country's effort to maintain military strength and civilian economy at the same time, will be crippled.

It's YOUR Job to Furnish More Scrap

Institute a steel scrap salvage program in your plant. Appoint one top official in your company to take full responsibility. Have him consult with your local Scrap Mobilization Committee and local scrap dealers. The nearest office of the National Production Authority, Department of Commerce, can tell you who your local Scrap Mobilization chairman is.

Do this now. Write for a copy of the booklet, "Top Management: Your Program for Emergency Scrap Recovery", to Advertising Council, 25 W. 45 St., New York 19, N. Y.

This advertisement is a contribution, in the national interest, by

SOUTHERN POWER & INDUSTRY



Refineries cut maintenance on insulated lines by switch to new low-cost aluminum jacketing "It cut jacketing application costs, and we expect it to last for years," report engineers at refineries everywhere after testing Childers Aluminum Jacketing on their insulated lines. This new Oklahoma refinery used Childers 100% — on towers and vessels (in heavy weight) as well as on lines, it is flexible and easy to put on, and this 35 elloy aluminum is tough and weather-resistant, even in corresive industrial atmospheres. This is the first and only jacketing especially engineered for process plants and power installations.

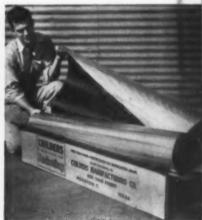
At least 567 processing plants have installed and tested this new Childers Aluminum Weatherproof Jacketing during the last three years. You can examine its advantages for your plant by writing for a free sample. Address Childers Manufacturing Co., Dept. SP-3, 3620 W. 11th St., Houston 8, Texas.



These lines are insured for years against wear and weather. They'll never need pointing because Childers Jacketing gives them all the advantages of appearance and long life that come only with weather-resistant aluminum. Yet this specially engineered jacketing costs for less than would heavy aluminum sheets.

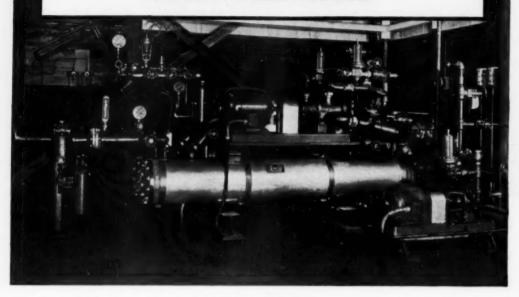


As shown here, Childers Jecketing can be attached with no more tools than a pliers and a wacden wedge. No expensive shop work or pre-forming are necessary. Several methods of attaching are available, but aluminum bends shown here are probably best and cheapest. Because this jacketing is so easy to handle and so simple to attach, it cuts installation cests way down.



This is how the flexible, easy-to-handle Childers Jacketing arrives at the job site. It is no convenient rolls 4 feet wide and 100 feet long—just right for one man to handle—and is available either with or without a moisture barrier attached on the back of the .006" aluminum "skin". It can be cut to proper lengths using any flat table and a straight-edge.

2 separate ENCO Fuel Oil Units Meet Plant Needs



Here is a typical Enco two-unit installation which handles fuel oil pumping and heating requirements in the plant of a building materials manufacturer.

Fuel Oil Pumping and Heating Unit, built with two pumps and two heaters, is designed for continuous plant load service. Capacity is 11 gpm Bunker C fuel oil with one pump or one heater at 300 psig pressure with a temperature rise from 90F to 230F.

Light Oil Pumping Unit for cold start-up service. Capacity is 3 gpm #2 oil at 300 psig pressure.

Enco pump sets are designed to give you easier control and longer maintenance-free operation. They are simple and economical to install. All you need do is to connect to station piping and run. Before shipping, every Enco Fuel Oil Pumping and Heating Unit is completely tested

under high pressures. For complete details on wide-range line, write for Bulletin O B -37.

Only ENCO offers all ten plus features

- Completely Automatic Operation is assured by automatic temperature and pressure regulation valves.
- Coordinated Design Saves
 Space. All equipment essential to the preparation of fuel oil for combustion is contained in one compact unit.
- Individually Designed to meet the specific needs of the particular power plant in accordance with its exact operating requirements.
- 4. All Parts Visible and Accessible for easy operation, maintenance and repair.

- 5. Pumps and Heaters are interconnected to provide maximum flexibility of operation.
- 6. Safety Valves protect individual parts where required.
- 7. Easier Maintenance Less Service-Time for Cleaning because straight tube, multi-pass heaters with removable heads are used.
- 8. Pumps Operate at Moderate Speed. Heaters designed to give the correct viscosity and velocity without fouling.
- Smoother Flow of Clean Fuel to Furnace. Air chamber for each piston pump prevents pulsations pressure regulator for rotary pumps. Twin type strainers provided to keep atomizer tips from clogging.
- 10. Cleaner Boiler Room . . . all overflows connected to a common outlet, flanged drip pan catches oil drip.

THE ENGINEER COMPANY

75 WEST STREET, NEW YORK 6, N. Y.

IN CANADA: F. J. RASKIN, LTD., 4220 IBERVILLE ST., MONTREAL 34. P. Q.



California

again ...

calls for Yarway

Contra Costa

Steam Plant

Pacific Gas & Electric buys additional

YARWAY

FLAT GLASS GAGES

Pacific Gas and Electric Company—a big factor in sunny California's amazing development—has used Yarway steam plant equipment a long time.

For instance, Yarway Pressure Sealed Flat Glass Gages have been specified in five of their new plants. Yarway glasses have been ordered for pressures from 1475 psi to 2050 psi. PG and E is just one of many companies who have used Yarway Flat Glass Gages for high pressure installations.

Longer gage life results from the "floating assembly" feature. Glass breakage and leakage is reduced. Newest feature is the Yarway Type M Illuminator which causes meniscus at water level to continue to shine like a star...even under adverse conditions.

Yarway engineers, conveniently located near you, are constantly working for better, more profitable steam plant operation. A Yarway man can help you. Just call him.

YARNALL-WARING COMPANY

Home Office: 116 Mermaid Ave., Philadelphia 18, Pa.

Southern Representative: ROGER A. MARTIN, Bonn Allen Building Atlan a 3 Ga

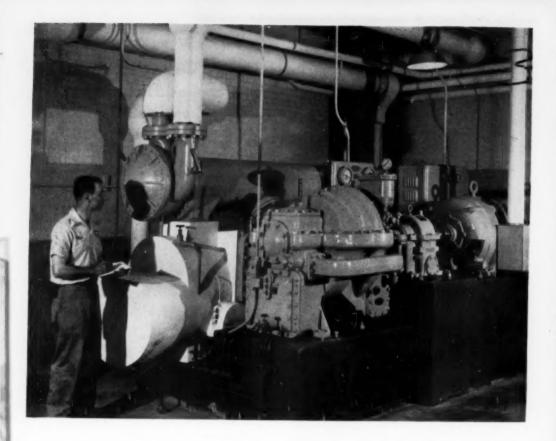
Kern Steam Plant

YARWAY SERVICE GOES ALL THE WAY

Moss Landing

Steam Plant





You Can't Tell

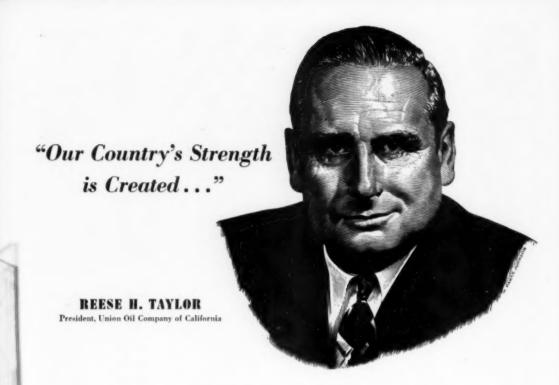
You can't determine efficiency by sound alone. Just because the wheels of your machinery are humming does not necessarily mean that down time caused by faulty lubrication is being held to a minimum. The problem of lubrication becomes more important and more difficult with the ever increasing complexity of modern industrial equipment operating at higher speeds with closer and closer tolerances, higher loads, and under varying operating conditions. To be sure of having the proper lubricants to fill your spe-

cific needs, call an experienced Standard Oil lubricating engineer. His knowledge, gained through constant contact with the power industry, is backed by the world's largest combined facilities for the research, testing and engineering of petroleum products. It will be well worth your while to call him today.

Standard Oil Company







"Our country's strength is created by the responsibility and solidarity of individual citizens in a self-chosen government and economy. It can—and must—be perpetuated against all who seek to undermine it. The men and women who invest regularly in United States Defense Bonds are contributing to our national integrity and to the traditions of personal independence so characteristic of a free people."

Every pay day, 6,500,000 employed men and women...
"are contributing to our national integrity and to the tradition of personal independence..." by the systematic purchase of United States Defense Bonds.

How important is this contribution to national economy and personal security? Let's look at a few figures.

- the cumulative purchases of 6,500,000 Payroll Savers add up to \$130,000,000 per month.
- the number of individual E Bonds sold in 1951 totaled 68,069,000 pieces-8% more than in 1950.
- purchases of \$25 and \$50 E Bonds—the denominations popular with Payroll Savers—were greater than the sales of \$500 and \$1,000 E Bonds.

- monthly redemptions of unmatured E Bonds during each of 9 months (April to December, 1951) were less than 1% of the amounts outstanding.
- the cash value of Series E Bonds held by individuals on December 31, 1951, amounted to \$34,727,000,000—\$4.8 billions more than the cash value of Series E's outstanding in August, 1945.

That Americans have built personal security and a reservoir of purchasing power exceeding \$34.7 billions is due in no small measure to the patriotism and foresight of men like Mr. Taylor and other leaders of industry who have made the Payroll Savings Plan available to their employees.

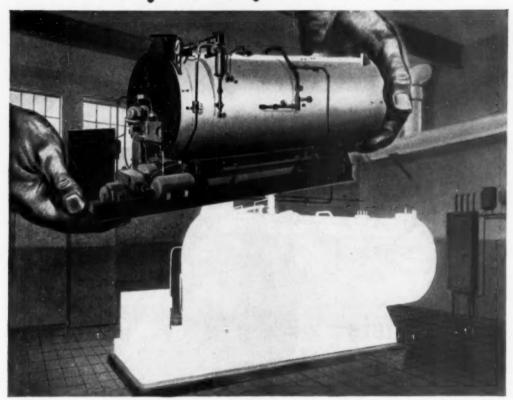
For help with your Payroll Savings Plan, phone, wire or write to Savings Bond Division, U.S. Treasury Department, Suite 700, Washington Building, Washington, D. C.

The U.S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

SOUTHERN POWER & INDUSTRY



Ready when you need it...



Save Installation - Construction Time — Expedite Emergency Installations — Serve Immediate Temporary Steam Needs — With a Cleaver-Brooks Self-Contained Boiler

WHEN speed is vital, you can save weeks of valuable installation time with a Cleaver-Brooks boiler delivered to location as a complete, factory assembled and tested, selfcontained unit, with much of the trim and accessories provided.

In an emergency the installation time can be reduced to as little as 48 hours, by following a properly planned and coordinated procedure of providing in advance the required facilities — foundations, headers, service and blow-off lines, fuel tanks and lines.

Prior to the completion of your building, Cleaver-Brooks boilers can be placed in operation to serve immediate steam needs. When permanently installed the change-over takes place with a minimum of labor and expense and the avoidance of interrupted steam service.

Cleaver-Brooks are the first and finest in modern, self-contained boilers — operate at a guaranteed efficiency of 80% — burn the fuel most available and economical in your area, gas, oil, or combination gas and oil — fully meet all codes — standard models available in sizes 15 to 500 hp; 15 to 250 psi.

CLEAVER-BROOKS COMPANY Originature of the Self-Contained Baller Bept. 6-304 E. Keefe Are., Milwookes 12, Wis., U.S.A. Edilic Address: Clehre-Milwookeevils



Write for latest, fully illustrated and descriptive Cleaver-Brooks Steam Boiler Catalog.

WHY INSTALLATION TIME IS CUT:

- Simple Low-Cost Stack
- No Job-Site Brickwork No Special Foundations
- Boiler Delivered as a Complete, Factory Assembled, Tested, Self-Contained Unit
- Centralized Responsibility No Waiting on Multiple Sources of Supply



Cleaver-Brooks

Builders of Equipment for the Generation and Utilization of Meet * Steam Boilers * Oil and Bitumen Tank-Car Heaters * Distillation Equipment * Oil and Gras-Freet Consension Burnans



CHAPMAN



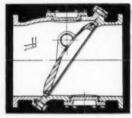
Exclusive Check Valve

Nothing can "unseat" the disc-ring of this valve from its drop-tight contact with the body-ring . . . because clearance at the hinge-pins means that this contact is complete. There is no sliding action, consequently no wear, no leakage. And the pivoted disc is cushioned to an easy, silent closing . . . without slam . . . in installations that don't have unusual piping arrangements.

What's more, hydraulic laboratory tests at a top engineering school prove that the specially designed disc and streamlined valve-body reduce head loss as much as 80% under conventional swing-type check valves. See the graphs of these tests . . . and illustrations of the unique construction features of Chapman Tilting Disc Check Valves . . . in Catalog No. 30 (yours for the asking). Write.

THE CHAPMAN VALVE MFG. CO. INDIAN ORCHARD, MASSACHUSETTS

hapman



Cross-section of the Chapman Tilting-Disc Check Valve. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

Timely Comments



Chief Engineer is Key Figure in Company Planning

THE CHIEF ENGINEER is the key figure in managementengineering communication and enjoys the broadest participation in company planning. Except for two areas corporate organization and finance—the chief engineers of industrial organizations participate more broadly in com-

pany planning than do Vice Presidents in Charge of Engineering. Of course, in a number of companies the positions of Chief Engineer and Vice President of Engineering are combined as the "single" top engineering job.

Project engineers also enjoy participation in management planning. They figure prominently in planning on engineering matters, new products and processes, and purchasing. Members of the engineering staff are also represented in planning in the majority of industrial companies. Percentage-wise they have negligible participation in other activities.

N.S.P.E. Research Survey

To determine where engineers stand in relation to top management on the problem of engineering-management communications, *The National Society of Professional Engineers* conducted a survey, asking what levels of engineering personnel participate in management planning on a series of important, everyday topics. The above is a portion of the survey disclosures.

The survey indicates that the key engineering executive throughout industry is the Chief Engineer. As the man in contact with top management on one hand and all the rest of the engineering employees on the other, he controls communication in both directions. He also determines the extent to which engineers participate in company planning.

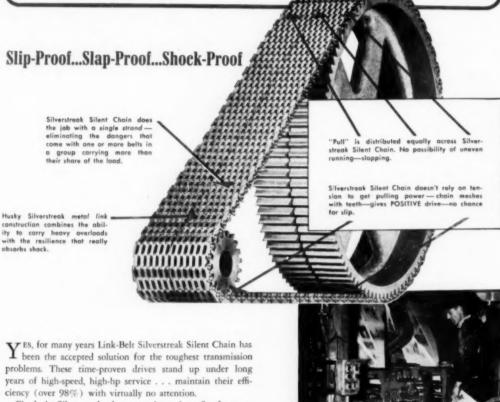
Although a large majority of companies want the opinions and suggestions of their engineers on company policies, there is minor participation in planning by the majority of engineers. Large companies, each employing over 2000 engineers, do the best job of communicating with their engineers. Small organizations were also found to do a good job of integrating their engineers into management. The large percentage of medium-sized to large firms who employ the majority of engineers were found to lack the close engineering-management relationship necessary for the best utilization of engineering manpower.

Report sums up the survey findings with a review of new techniques and the latest research on improving group communication, and suggests a detailed formula for improvement. Program includes the plan of an "Engineering Audit", which individual companies can apply to determine how effective are their particular communications. Next step is a plan for the review and test for effectiveness of communications methods and media. Up-to-date techniques in conduct of conferences are presented. Third step is the designation of a single top management man to be responsible for effective communications.

Specific contents of the first of a series of Executive Research Surveys by the N.S.P.E., include the lines of industrial communication—who participates, how management gets the opinions of its engineers, what engineers want to know about management policy, the media of engineering-management communication, development management potential in trained engineers, and how to improve communications.

Copies of the 48-page report "How to Improve Engineering-Management Communications" can be obtained at \$2 per copy from The National Society of Professional Engineers, 1121 Fifteenth Street, Northwest, Washington 5, D. C. L. L. Dresser, President of Dresser Engineering Company, Tulsa, Oklahoma, is President of the professional society.

High-speed, high-hp power transmission is an old story for Silverstreak Silent Chain Drives



Check the Silverstreak advantages shown here. See for yourself why so many concerns that must combine top transmission efficiency with unfailing dependability—standardize on Link-Belt Silverstreak Silent Chain Drives.



SILVERSTREAK SILENT CHAIN DRIVES

For 12 years, six 100-hp, 4700 f.p.m. individual Link-Belt Silverstreak Silent Chain and two-speed Herringbone Gear Drives at the Miami Daily News have served effectively, maintaining accurate register with minimum maintenance.

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices, Factory Branch Stores and Distributors in Principal Cities. 12,792

Industry Speaks



SYNTHETIC FIBERS— AS SOUTHERN AS A COTTON FIELD

Adapted from comments by Dr. Frank J. Soday, Director of Research and Development, The Chemitrand Corporation, Decatur, Alabama, before the American Industrial Development Council's 1952 Annual Conference in Washington.

NE OF THE MOST important groups of new products of the chemical industry that will have a profound effect on our standard of living is that of synthetic textile fibers. At the present time, the synthetic fiber industry exceeds all other branches of the chemical industry in rapidity of growth and possibilities for the future.

Man-Made Fibers

The advent of rayon in 1891 did not result in any marked displacement of natural fibers in the textile industry. Silk continued to be used in undiminished quantities until the outbreak of World War II effectively stopped all imports. Over 29.2 million pounds of silk was consumed in this country in 1920, compared with 35.8 million in 1940. The same situation prevailed with respect to cotton, per capita consumption increasing from 17.7 pounds in 1930 to 26.6 pounds in 1950.

Increasing consumption of synthetic fibers has been paralleled by a corresponding increase in the consumption of natural fibers. The products complement each other.

With the success of nylon, first wholly synthetic fiber to be manufactured, the textile industry is on the threshold of a new era with the advent of still newer synthetic fibers.

So intense has been the public's interest in these new fibers that many, such as Du Pont's Orlon and Dacron, Union Carbide's Dynel and Chemstrand's Acrilan, have become household words before they appeared on the market in any substantial quantities.

A Southern Industry

The synthetic fiber industry is almost exclusively a Southern industry and already has grown to large proportions with production in excess of \$1 billion and plant investments in about the same amount. Raw materials purchases amount to \$500 million per year, and the yearly payroll is in excess of \$250 million.

It has been freely predicted that manufacture of synthetic fibers will become one of the South's most important industries. The South is the logical location for this industry, close to the basic petro-chemical raw materials abundantly available in the area, and close to finishing

mills where 80 per cent of the cotton spindles are located and where many woolen mills are locating.

Where Are the Producers?

Rapid developments in the synthetic fiber field may be illustrated by the activities of some of the producers. Monsanto is building a large acrylonitrile plant at Texas City, Texas, and Carbide and Carbon is constructing one at Institute, West Virginia. Cyanamid has announced plans for the construction of a large acrylonitrile plant near New Orleans and has received governmental approval for the project.

Du Pont's Orlon plant for the production of continuous filament yarn is located at Camden, South Carolina. An additional plant is being constructed at the same location for the production of Orlon staple fiber.

Carbide and Carbon has a Dynel plant at Charleston, West Virginia and has announced plans for the construction of a much larger plant at Spray, North Carolina.

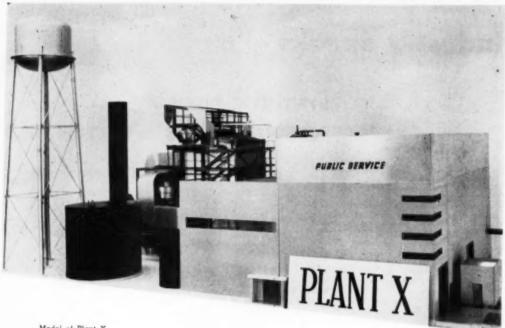
Du Pont is constructing a large plant for the production of Dacron at Kinston, North Carolina, to be in full production next year.

Acrilan

The Chemstrand Corporation, owned jointly by the American Viscose Corporation and the Monsanto Chemical Company, was formed in 1949 to engage in the development and manufacture of synthetic fibers. As a result of an intensive research and development program, an acrylic fiber called Acrilan was developed.

Acrilan is now being produced in a pilot plant at Marcus Hook, Pennsylvania, having an annual rated capacity of one million pounds of staple fiber.

Chemstrand is building a plant for the production of 30 million pounds of staple fiber annually at Decatur, Alabama, with initial production scheduled for early summer. In June of 1951 the company was licensed to produce and market nylon, and a plant for the manufacture of 50 million pounds of continuous filament nylon annually is being constructed at Pensacola, Florida. Initial production is scheduled for late in 1953 or early in 1954.



Model of Plant X

PLANT X PREVIEW

150,000 kw additional capacity scheduled for Southwest by Southwestern PUBLIC SERVICE Company, Amarillo, Texas

By E. W. ROBINSON, System Plant Engineer, Southwestern Public Service Company, Amarillo, Texas

THE first unit of Southwestern Public Service Company's newest generating station, Plant X. located about 10 miles north of Amherst, Texas, is scheduled for commercial operation in June of 1952. This unit of 50,000 kw capability is to be followed by the addition of a second turbo-generator of 100,000 kw capability, construction of which was begun in February, 1952, with completion scheduled for mid-1953. With this unit in service, Plant X will become the largest of the eleven

steam generating stations operated by the company.

The new plant will generate electricity at 13,800 volts which will be stepped up in the Plant Substation for transmission over approximately 644 miles of 115,000 volt lines serving farms, homes, businesses, and industries of the Texas Panhandle and Eastern New Mexico

In addition to being the largest generating plant owned by Southwestern Public Service Company, it will operate at the high-

est average steam conditions, these being 875 lb-900F and 1300 lb-950F, for the first and second units respectively.

The building will have insulated steel panel type walls with all equipment housed excepting the boilers, which will be weatherproofed with a steel casing.

Cooling System

Plant X, like most of Southwestern's power plants, will rely on water wells for its cooling water supply, and utilize cooling towers for steam condensing purposes.

The cooling system employed at Plant X utilizes two Fluor cooling towers per generating unit. All towers operate in parallel and are placed in a wheel-spoke configuration, which arrangement is believed to be unique in power plant practice. The completed "cluster" consisting of six towers will ultimately serve three turbogenerators. Further additions will require the start of a new cluster. The advantages of this novel arrangement are four fold: (a) Performance is not affected by wind direction; (b) compact arrangement is an aid to operation; (e) maximum saturable air volume is contained within the minimum circumference, and (d) first costs are minimized since pipe and flume lengths are reduced.

Water wells located on approximately one mile spacing within a 10,000 acre tract of land surrounding the plant will supply all the water requirements. These wells are drilled to an average depth of 200 ft through water-bearing formations, with each well designed to produce 500 gpm. Micro wave radio is being considered as a means of operating the wells from the plant control room.

Water Treatment

Treatment of the well water for steam condensing purposes involves injection of sulfuric acid for scale prevention and chlorine for algae control. Like the cooling tower arrangement, the acid feeding system of controls is believed to be unusual in plant practice. The usual manually operated acid feeding system demands constant attention and frequent water tests to produce good results. Experience proves the pH of the water must be held within narrow limits to prevent scale or corrosion of the piping. To better insure correct pH values, a system of automatic controls was worked out for Plant X.

Since the treated makeup water required in the system is essentially a function of heat load on the condenser, plus blow down requirement for concentration control, a meter recording the flow of condensate from the condenser hot well is used to evaluate the heat

more power for the Southwest

Southwestern Public Service Company, with headquarters in Amarillo, Texas, serves an area as large as the states of Pennsylvania and Rhode Island. By June of 1953, its eleven steam generating stations will have a generating capability of over 500,000 kw, serving homes, businesses and industries of the Texas Panhandle and Eastern New Mexico.

Plant X will be the largest of the eleven generating stations. Initial 50,000 kw G-E unit is scheduled for commercial operation this month. Second G-E unit of 100,000 kw capability in mid-1953. C-E 500,000 and 1,000,000 lb/hr boilers are being installed for outdoor operation. Turbine, heaters and pumps are housed in an insulated steel panel building, pressurized to limit dust nuisance. All controls for turbines, boilers, and electrical equipment are centralized in one control room.

unusual design features in Plant X

Cooling System—Two cooling towers per generating unit... Towers operate in parallel and are placed in wheel-spoke configuration . . . Advantages include: (a) performance not affected by wind direction, (b) compact arrangement aid to operation, (c) maximum saturable air volume contained within minimum circumference, and (d) first costs minimized since pipe and flume lengths are reduced.

Water Treatment—Automatic control-feeding system for injection of sulfuric acid for scale prevention and chlorine for algae control in condenser water . . . Since treated makeup water required in system is a function of heat load on condenser plus blow down requirements for concentration control, a meter recording flow of condensate from condenser hot well is used to evaluate heat load on condenser and a flow meter uses this indication to regulate amount of makeup water and acid required . . . A level recorder, overriding all other controls, prevents water in system from overflowing or dropping too low.

Cooling Tower Design—Unusual type of mounting within towers for easy removal of coil-shed coolers . . . to facilitate deposit removal, cooling units equipped with flanged wheels which run on angle iron tracks . . . removal effected by breaking pipe connections and pulling coolers out through special doors in towers.

Who's Who

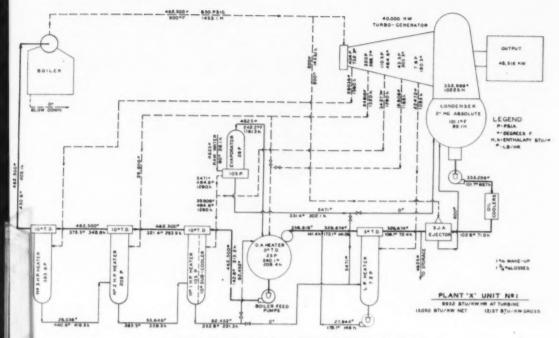
at Southwestern Public Service Company

General Supervision

H. O. Hodson Vice-President and Operating Manager

Plant Design

E. W. Robinson	System Plant	Engineer
L. F. Ridings		
Cleon Ligon	Mechanical	Engineer
P. J. Hoare	Structural	Engineer
J. R. Gibson	Electrical	Engineer



Flow Diagram, Plant X, Southwestern Public Service Company

load on the condenser. The flow meter uses this intelligence to regulate the amount of makeup water required as the result of the condenser loading. A flow meter placed in the makeup water line is used in turn to regulate the amount of acid required by the makeup water. This flow meter also regulates the quantity of water bled from the cooling system to maintain the desired concentration. Overriding all other controls is the level recorder which prevents the water in the system from overflowing or from dropping too low. A pH meter is also installed as a guide for presetting the automatic controls, and to sound a warning should an upset in the treatment occur.

Turbine Generators

The turbo-generator installed as the first unit is a General Electric tandem compound, double flow, 3600 rpm, 850 lb-900F machine, having a capability of 50,000 kw at .834 power factor, 25 lb hydrogen pressure, and 3½ in. mercury

absolute back pressure. Steam is extracted from five stages for regenerative feed water heating. The generator is equipped with a 165 kw, 250 volt, direct connected exciter. A two-unit, 3-bearing 275 kw, 250 volt, motor driven exciter serves as the spare for the 50,000 kw unit and is of sufficient capacity to serve also as a spare for the second unit of 100,000 kw capability now under construction. Voltage control is obtained from amplidyne motor-generator equipment.

Condensing Equipment

The turbine exhausts into a horizontal, two-pass, divided water box Allis-Chalmers condenser having 42,500 sq ft of cooling surface. Cooling water for the condenser is provided by two horizontal circulating water pumps, each having a capacity of 22,100 gpm at a total head of 75 ft. Due to space limitations, and to effect a saving in equipment costs, the usual check valves on the pump discharge lines were omitted. In their stead, rub-

ber seated, power operated, butterfly valves were installed, with their power cylinders interlocked with the motor starters. These valves automatically open when the pump is started, and close when the unit is stopped, thereby performing the same service that a standard check valve would provide.

The auxiliary heat exchangers, including the hydrogen coolers, spare oil cooler, hydraulic coupling coolers, and air compressors are supplied with treated water from a closed cooling water system. This water is pumped from a storage tank through the various coolers. The heated water then passes to multiple coil-shed type coolers installed in the base of the tower end-cells, just above the basin water level. From the coil-shed coolers, the water returns to the storage tank where it is again available for cooling purposes.

An interesting feature of this closed cooling water system is the type of mounting developed within the towers for easy removal of the coil-shed coolers. It is recognized that these coolers will collect deposits which will have to be removed periodically. To facilitate removal, the individual cooling units were equipped with flanged wheels which run on angle iron tracks. Removal is effected by breaking the pipe connections and pulling the coolers out through special doors in the towers. As one visitor commented, "It is like pulling a drawer out of a filing cabinet."

Boilers

The steam supply to the first generating unit is obtained from a three-drum bent tube C-E boiler having a maximum continuous capacity of 500,000 lb/hr. Total boiler surface is 34,465 sq ft. A pendant type Elesco superheater provides steam at 875 lb-900F between the rates of 300,000 lb/hr and 500,000 lb/hr by proper operation of bypass dampers. The unit is fired from twelve Forney DY-6 combination gas and oil burners mounted at the rear of the boiler. It is believed that superior performance will be obtained through rear firing with this type burner. A large Ljungstrom regenerating air preheater located at the rear of the boiler recovers heat from the flue gasses and permits an overall boiler efficiency of 83.4 per cent. The normal fuel is natural gas from Panhandle gas fields, but two 20,000 barrel capacity fuel oil storage tanks are installed near the boiler for emergency use. Since Plant X is located in a region where high winds carry dust and sand, it was believed advisable to provide some protection for the boiler fans, instruments, and burner areas. This was accomplished by placing all equipment within the confines of the boiler supporting steel and casing the necessary area with steel panel walls.

The boiler serving the 50,000 km unit is supplied with feed water by two six-stage, horizontal, split case Worthington boiler feed pumps. Each of the pumps is fitted with a 5 per cent chrome steel casing, and stainless steel trim. Hydraulic couplings are used between drivers and pumps to obtain variable speed type of capacity control. The pumps are driven by 1250 hp, 3600 rpm, 2300-volt motors; and each delivers 1165 gpm, at 1125 psi total head.

Auxiliary Equipment

Correct water level in the boiler is obtained by three-element Bailey automatic controls which govern the hydraulic coupling speed of the boiler feed pumps. The conventional feed water regulating valve was omitted at Plant X as it is believed the hydraulic couplings will accomplish the same results without the use of the valve.

Regenerative feedwater heating is obtained with a five-bleed system employing one low pressure closed heater, one open deaerating heater, and three closed highpressure feedwater heaters. The final stage of heating delivers water to the boiler at approximately 420 F at full load. The first high pressure heater contains a sub-cooling zone which reduces the temperature of the high pressure drains returning to the deaerating heater. This arrangement permits the evaporator to operate at higher ratings and also increases the efficiency of the heating cycle.

Distilled boiler water makeup is supplied from a horizontal bowedtube Griscom-Russell evaporator which has 320 sq ft of heating surface and a capacity of 12,000 lb/hr distilled water.

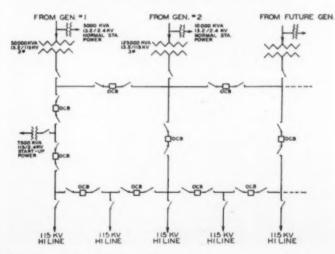
Feedwater to the evaporator is preheated in a hot process lime-soda Worthington softener followed by a hot zeolite process to eliminate residual calcium and magnesium. The hot process softener was selected as a practical means of reducing dissolved silica contained in the raw well water to a very low value, and the combination of hot lime-soda plus hot zeolite accomplishes the reduction of calcium and magnesium salts most economically.

Other Features

The generator is directly connected to a three phase 50,000 kva, type OA-FA transformer with a forced air cooling rating of 62,000 kva. This transformer steps up the generator voltage of 13,800 volts to 115,000 volts. Power at 115,000 volts enters a high voltage double ring bus which serves the 115 kv transmission lines. The double ring bus has the advantage of permitting removal of any section of the bus without impairing service to the transmission lines.

Normal station power is obtained from a three phase 5,000 kva, OA-FA transformer which is

Schematic Diagram, 115 kw double ring bus, Plant X. Any section of bus can be removed without impairing service to the transmission lines.



connected solidly to the generator leads ahead of the 50,000 kva power transformer. Start-up and stand-by station power is obtained from a 7,500 kva transformer, which takes power from incoming 115,000 volt lines and steps it down to 2,400 volts for plant use.

Controls for the boiler and turbine are centralized in an air conditioned, acoustically treated, control room located on the turbine floor between the turbine and

boiler. Industrial television equipment will be supplied with the second boiler unit for observation of boiler furnace and water gauge glass.

The visitor to the plant site is usually interested in the conditions which dictated the choice of location. Factors influencing the decision are (a) abundance of well water, (b) availability of fuel gas, and (e) system electrical characteristics. Months of study and ex-

ploration were required to pick a site where all these conditions would be met. During the long period of investigation the station was referred to as "Plant X." which name implied the many unknowns involved in the final plant design and location. When the "X marking the spot" was at last placed on the system map, the name had become so firmly established it was decided to christen the station "Plant X."

STEAM GENERATING EQUIPMENT

PRINCIPAL EQUIPMENT-Plant X, Southwestern Public Service Company

GENERAL DATA	STEAM GENERATING EQUIPMENT
Name of Station. Plant X Station Site Generating Capability, 1st Unit. 50,000 kw Generating Capability. 2nd Unit. 100,000 kw Boller Capacity, 1st Unit. 500,000 lb/hr Cooling Water Source. Water Welley Constructors and General Contractor Missouri Valley Constructors and General Contractor Fischbach & Moore, Inc. Blectrical Contractor Southwaters Public Service Company TURBINE-GENERATORS	Boller, 1st Unit. One Combustion Engineering Company. Three drum, bent-tube boiler. Boller heating surface 26,000 sq ft. Water Wall surface 8465 sq ft. Capacity 569,000 lb/hr, maximum continuous. Drum design pressure 975 psi. Fendant superheater designed to maintain 900 F plus or minus 16 degrees from 309,000 lb/hr to 509,000 lb/hr. Rypass demper steam temperature control, steel cased. C. E. Superheater Eleaco, 13% of surface is carbon-moly-litanium seamless steel tubing, 25% of surface is moly-litanium seamless steel tubing. 25% of surface is tubing. Air Preheater One. The Air Preheater Corp.
Turbine, 1st Unit	Air PreheaterOne. The Air Preheater Corp. Ljungstrom type 23½ V with 54* deep elements. Designed to heat 524,000 lb/hr of 80 F air to 589 F.
Turbine, 2nd Unit	Blow-off Valves
Generator, 1st Unit	Blow-off Tank Wilson Detrainer.
Generator, 2nd Unit	Burners
Exciter, 1st Unit General Electric 185 kw. 250 Volt. Direct Connected	StackOne 11 ft diameter by 75 ft high
Spare Exciter, 1st & 2nd Unit General Electric. 275 kw. 1200 rpm, 250 Voits	Combustion Control Bailey Meter Company, air oper-
Exciter, 2nd Unit	ated. Fuel Oil Pumps. DeLaval Steam Turbine Company. Forced Draft Fan Sturtevant-Westinghouse No. 145
Generator Coolers	TV9DWDI Arrsf. 3. Class 3, 180,000 c'm at 10.3" water static head, and 100 F air temperature. Inlet Vane control.
Turbine Oil Coolers One G. E. 105 F for Condensate, and One for Raw Water	450 hp motor. Induced Peuft Fan Sturtevant-Westinghouse No. 1011
Turbine Oil Filters	TV-ID, Des. 35. DWDI Arrgf. 3, Class 6, 263000 cfm at 14.8 inches water static head and 280 F gas temperature. 900 hp
BOILER FEEDWATER EQUIPMENT	motor.
Bollee Feed Pumps	CONDENSING EQUIPMENT Condenser No. 1 Usti
INSTRUMENTS	WATER TREATING PLANT
Gauges Manning, Maxwell & Moore, Black on white faces. Thermometers American, Conductivity Recorders Bailey Meter Co. PH Recorders Bailey Meter Co. Oxygen & Combustibles Secorder, Bailey Meter Co. Oxygen & Combustibles Secorder, Bailey Meter Co. Barometer Manning, Maxwell & Moore.	Water Sefteners Worthington Co. deacrating hot process asfesser with set capacity of 6,000 gpb. One set of two Worthington hot process zeolite softeners with capacity of 4000 gph. PIPING AND VALVES
	Pipe Insulation Unibestos with aluminum jacket
ELECTRICAL EQUIPMENT Switchboard	covering. Boiler Feed Check Valves
Voltage Regulator	MISCELLANEOUS
OA-FA, three phase 13.8/115 kv. Normal Station Power Westinghouse 5,000 kva. OA-FA.	Sump Pumps Worthington Company Type 3QP. Deep Well Pumps Peerless Pump Co., 500 gpm at
three phase 13.8/2.3 kv transformer. Standby Station Power Westinghouse 7,500 kva OA-FA. three phase 115/2.3 kv transformer. Station Power Switchgear Westinghouse Electric Co. Oil Circuit Breakers Westinghouse. Storage Battery Exide, Electric Products Co. 125 voits—EMB-17 60 cell.	Small Tanks Wyatt Metal & Boiler Works. Large Tanks Chicago Bridge & Iron Co. Air Compressors Three—Worthington Co., horizon- tal, 199 cfm at 109 psi. Building Walls Robertson Q-Panel Steel insulated

Battery Charger Electric Products Company 71/2 kw diverter pole.

wall panels.

Control Room Partitions...... Hauserman.

BETTER CENTRALIZED CONTROL IN POWER STATION OPERATION

Initial wired TV installation in Virginia Electric and Power Company's Chesterfield Station checks boiler water level. Subsequent application of the Utiliscope will show flame conditions in boiler furnace.

WIRED television is helping operators of Virginia Electric and Power Company's Chesterfield Station, near Richmond, Virginia, maintain closer check on boiler operation. The plant has a rated capacity of 110,000 kw, and a third unit of 90,000 kw is nearing completion.

At present the new television unit is being used experimentally to picture the water level indication from an elevated gauge. But the next time the boiler is out of service for inspection, the camera will be installed in the top of the boiler so that flame conditions

within the boiler can be observed at the control station.

Control board operators will be greatly benefited by being able to see exactly what is going on in the combustion chamber without leaving their position at the board. The unit will give a continuous picture story of furnace operation—fuel ignition, stability, performance of burners or loss of fire.

The Utiliscope is a product of the Diamond Power Specialty Corporation. The installation consists of three principal elements—camera, small power unit and the viewing screen. The present installa-



The Utiliscope camera of the Diamond Power Specialty Corporation's wired television unit is focused on the water level gauge.

tion at the Chesterfield Station has the small camera and power unit located near the top level of the station and the viewing unit located several stories below near the boiler control board. The camera and two lights at present are focused on the water gauge and the picture is reproduced on the screen downstairs. Later, flame conditions inside the boiler will be shown in the same way.

Shortly after the unit was installed, board operators were surprised to see on their screen, not the gauge, but a fine specimen of calendar art which was being held in front of the camera by an employee with an inclination toward experiments. Operators reported excellent reception.

Applicational data and illustrations courtesy of The Vepcovian, publication of the Virginia Electric and Power Company, Richmond, Virginia.

The Utiliscope receiver is temporarily installed on a table adjacent to the control board. The operator can actually see what is going on beyond his range of vision. The receiver will soon be permanently installed at eye level at the end of the control board.



The new Fiberglas yarn plant in Anderson, S. C.—world's largest, most modern of its kind — is situated on a 134-acre plot south of the city. Volume production in the plant will help assure adequate Fiberglas yarn supplies during 1952.



Air Conditioned Fiberglas Plant

Makes Glass Textile Yarns at Anderson, South Carolina

THE new Fiberglas textile yarn plant, recently constructed by Owens-Corning Fiberglas Corporation at Anderson, South Carolina, is believed to be the world's largest, most modern, and fully equipped plant of its kind.

Advantages of the Anderson area, cited by Harold Boeschenstein, president of the corporation, include: an adequate supply of the natural gas needed for uninterrupted year-round production; proximity to many textile firms that are actual or potential Fiberglas yarn customers, and an outstanding community of men and women residents from whom to select the plant's working staff.

Anderson's Fiberglas yarn plant—extensively air conditioned—is of single-story brick and insulated steel panel construction, has 265,-400 sq ft of floor space, and is situated on a 134-acre plot on State Highway 81, four miles south of Anderson. In the power house at

Heat radiated by high temperature equipment is shielded from work areas by water cooled steel panels. Circulated air cooled by refrigeration.

the north side are two 60 hp compressors for process air, three 350 hp boilers to supply steam for heating the plant during cold spells and for process work, and a 500 kva Diesel-electric emergency power generator.

The plant was designed by Lockwood Greene Engineers, Inc., New York City and Spartanburg, S. C., and built by the Daniel Construction Co., Greenville, S. C.

After the selected silica sand, limestone and other mineral ingredients are received and stored, they are properly mixed, and then move in cars on a monorail conveyor from the batch house across a steel bridge into the huge furnace hall. Here, the mineral ingredients are melted into glass. Subsequently, molten glass flows down through tiny apertures of bushings or feeders and the tiny streams are mechanically attenuated at high speed into exceedingly fine glass filaments. The filaments are gathered on winding mechanisms and groups of filaments then go to fabricating departments for twisting, plying and

other processing into various Fiberglas yarn products.

Air Conditioning

The manufacture of glass products is an exceedingly "hot" operation, with temperatures well above 2,000 degrees Fahrenheit usually employed. At Anderson the new Fiberglas yarn plant is air conditioned throughout production, service, shop and office areas. The system will maintain the uniform temperature and humidity conditions required for conformity with manufacturing specifications, as well as provide comfortable working conditions. The air conditioning system was manufactured by Carrier Corporation.

Also contributing greatly to maintaining controlled inside working temperatures—in cool as well as hot, humid weather—is Fiberglas Roof Insulation, used in varying 34 and 2 in. thicknesses between the plant's pre-case cement tile roof and asphalt built-up roof.

Water for the air conditioning system and other plant requirements is piped through a 12 in. main from the city of Anderson, four miles away. The water used for cooling is recirculated through coils in the plant's air conditioning system, various units of the process equipment and the spray pond by 60 hp pumps, each having a capacity of 1,500 gpm. There are four recirculating pumps and two additional ones which serve as standbys. There is also a fire pump of 1,000 gpm capacity.

In a basement area of the plant, two 500 hp compressors chill the water which is piped to the air conditioning coils. Spray pond water also is piped to hollow cooling panels enclosing the furnace walls. From three fan rooms on the plant roof and two in the basement, air is blown through ducts, cooled as it passes through the coils and circulated throughout working areas.

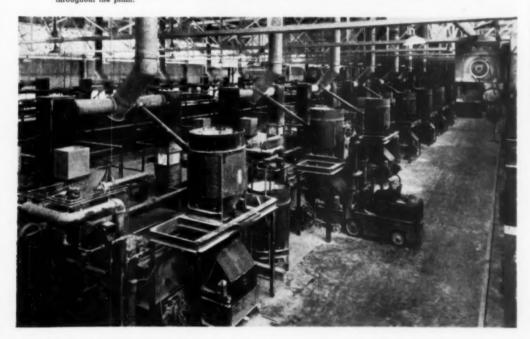
Hundreds of Fiberglas Dust-Stop Air Filters at intakes of the air conditioning system help keep the circulating air clean. Fiberglas Aerocor, which covers the air conditioning ducts, helps keep the circulating air cool and reduces noise from air passage.

Thoroughly tested in an elaborate pilot plant operation, the new Carrier air conditioning system holds temperatures to a maximum of 80 F and eliminates more than 90 per cent of the heat radiations in the area surrounded on three sides by the furnace.

The Carrier system combines radiant panel cooling with distribution of completely conditioned air. This is the first such installation of its kind, Carrier officials stated, but is believed to be adaptable to other industrial applications.

As designed for the new Anderson plant, radiant cooling panels shield the working aisles from the melting tanks and the forehearths. These panels cut off the heat radiation, and handle about 70 per cent of the cooling. The panels are made

The turnace hall of the new Fiberglas plant of Owens-Corning Fiberglas Corporation, at Anderson, S. C. Here, the development of an unusual cooling and air conditioning system furnished by Carrier Corporation enables employes to work near equipment operating at temperatures exceeding 2,000 degrees F. This photo shows hoppers containing silica sand, limestone and other ingredients being placed into position by lift trucks at the side of the glass melting furnaces. Carrier's temperature control also helps maintain uniform product quality throughout the plant.





In this manufacturing operation at the new Anderson plant, glass filaments are being twisted into Fiberglas yarns on a high-speed twister frame.

of two thin sheets of steel welded together, with one of the sheets embossed to provide water circuits within the panel.

The additional air conditioning system necessary to establish the specified 80 F and 50 per cent relative humidity supplies air through specially designed continuous slot, pan-type outlets. Air emerges from a slot in a duct running the length of the aisle, and is deflected into a diffused stream.

The fabricating area in the new plant, an extensive finishing room where the yarns will be further processed, together with the plant offices, shops, cafeteria, and first aid rooms are also completely air conditioned. A relative humidity of 60 per cent is maintained in the finishing room.

Refrigeration for the air conditioning is provided by two Carrier centrifugal refrigeration machines with a combined cooling capacity of 1,000 tons. The radiant cooling panels and the refrigeration machine condensers are supplied with water recirculated through a spray pond to be located adjacent to the plant. The water enters the cooling panels at a maximum of 85 F and leaves at 100 degrees. Total cooling provided by the water-cooled panels and the air conditioning system is about 1,350 tons.

Wherever they can make the Anderson plant's operation more efficient, increase employee working

Officials of Anderson Plant

George S. McElroy is manager of the new Fiberglas yarn plan at Anderson. His staff includes: Edward J. Donahue, Forming Manager; John J. Webber, Furnace Engineer; Harold E. Moss, Industrial Engineer; J. Ernest Craig, Purchasing Agent; Raymond E. Hurley, Technical Control Manager; Owen C. Divan, Service Manager; W. Frederick Sprague, Plant Auditor; Richard W. Muzzy, Cost Control Manager, and Hal G. Humphries, Personnel Manager

comfort or improve appearance, Fiberglas materials have been used in construction. A spectacular application is the use of eight-foot-deep strips of translucent corrugated blue panels, of Fiberglas-re-inforced plastic, around top portions of walls of the forming area, batch house and boiler house and across one side of the bridge connecting batch house and plant. These Fiberglas-plastic panels have an attractive exterior appearance and transmit a soft, pleasant light to the inside.

Serving as a heat barrier and contributing to the plant's air conditioned comfort is Fiberglas Roof Insulation, covering the entire 265,-400 sq ft of roof area in the main plant and boiler house.

Fiberglas acoustical materials trap sound waves and contribute to a more quiet, restful, efficient work atmosphere in the plant finishing, cafeteria and office areas. In the finishing area, Fiberglas Acoustical Board forms a suspended ceiling over the noisiest section of this operation.

Fiberglas Pipe Insulation is used on steam and chilled water lines and Fiberglas PF Insulation on steam boilers. Fiberglas PF also insulates the tanks and lines which are used for application of sizing to the glass filaments in production.

Motors, generators, transformers and power lines have Fiberglas-base electrical insulation.

Underground gas distribution lines, connecting with the Transcontinental main about 500 feet from the plant, are protected against corrosion by spiral wrappings of Fiberglas Coromat, impregnated with a hot bituminous enamel.

How The "Y" Serves Southern Industry

74 Southern YMCA's conduct human relations programs 1,100 Southern firms participate in these projects

By L. R. ROBBINS, Westinghouse Electric Corporation, Atlanta, Georgia

THE rapid industrialization of the South has brought forcefully to the attention of Southern management and labor, the important role played by the Young Men's Christian Association in dealing with human relations in industry. Since the "Y" has gone quietly about its job—self-appointed—of promoting better human relations in all levels of industry, public journals have not devoted much space to the "Y's" activities in this field, which in view of 106 years' experience are extensive.

It is not extraordinary that the "Y" should have such large experience in promoting better labormanagement relations, for in effect that is how the "Y" got started. A group of clerks in a London drapery store, back in 1844, decided to found an organization for their mutual development and improvement. They called themselves the Young Men's Christian Association. So successful was the original group that the idea was soon propagated in other London firms. In 1851 the idea spread to America via travelers returning from the London Exposition of that year. Last year was the 100th Anniversary of the first "Y" in this country, which was established in Boston.

Some people, presumably because of the "Y's" notable success with athletic programs, think of it only in terms of a community bulwark against delinquency. Just as important to the "Y"—and those whom the "Y" helped to help themselves—are the industrial services performed in the new South.

Regional Work

There has been an area-wide YMCA Industrial Service committee and Industrial YMCA Secretary since 1943 giving full time to helping develop industrial programs and working with management and labor.

In 1951, a group of representative industrialists met in Biloxi, Mississippi, for the Seventh Annual Gulf States Industrial Conference, to discuss such matters as: "Getting the Most From Labor," "Morale and Productivity," and "Small Business and Its Manpower." This marks the eighth year for the group. In its fifth year the Kentucky-Tennessee-Ohio Valley-Employee-Relations Conference has set high standards for extending the areas of agreement in labor-management problems.

The "Y" enacts no legislation and passes no resolutions, rather it brings people together in an atmosphere, where the solution to their problems can be worked out by themselves. The "Y" sees that optimum conditions exist in these meetings and in this respect the "Y" acts as a catalyst. The "Y's" role, then, in industrial relations has been far from "do-nothing."

Popular on the local level are the "Y's" one-day institutes on "Human Relations" which are conducted in thirty cities in cooperation with businessmen. They are similar in scope to the regional conference.

The past decade marked the rapid industrialization of the South, and the "Y" has expanded its industrial services to the point where there are now 74 Southern

YMCA's conducting human relations programs with industry. The "Y" has especially focused its attention on the problems of small businessmen who do not have personnel managers and labor relations experts.

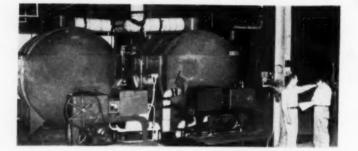
There are now 1,100 Southern firms participating in these YMCA programs. The YMCA's centurylong experience in helping people get together and plan their own welfare has been simply—but effectively—applied to Industrial Relations. Such programs are financed through corporate contributions from industry and businesses which supplement the YMCA projects.

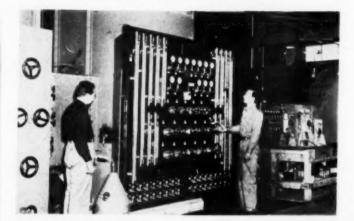
The programs which the "Y" sponsors are remarkably wide in coverage. There are 26 Industrial Management Clubs for supervisors, foremen, and management personnel. The role of the "Y's" more or less old standby, athletics, has not diminished; there are over 55 cities with "Y"-sponsored athletic activities in the new South which supplement the work in industrial services.

The YMCA's years of human relations experience is anyone's for the asking and you will find a time tested, proven, effective program—rooted deeply in practical everyday Christianity.

The Southern Area YMCA Industria. Services Committee whose chairman is M. A. Abernathy of the United Gas Pipe Line Company, Shreveport, Louisiana, works with all cross-sections of Southern Industry. Mr. Abernathy has served in that capacity since 1943. M. E. Mischler, who is the Area YMCA Secretary, coordinates these industrial services from his head-quarters in Atlanta, Georgia.

CENTRAL SYSTEM OXYGEN-ACETYLENE LINES FOR SOUTHWESTERN INDUSTRY



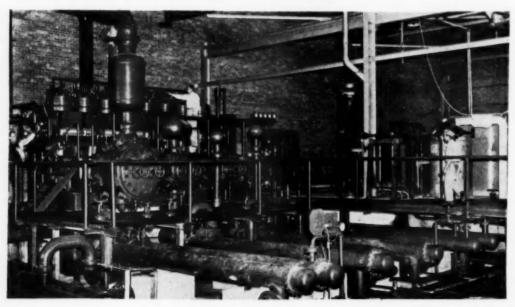


Southwest's rapidly

Two liquid oxygen storage tanks and high pressure pumps in the new Houston Oxygen Company plant in Houston, Texas. Each of these tanks holds the liquid equivalent of 1,000,000 at 16 of oxygen gas. This is the main source from which volume production of oxygen gas is produced. The liquid oxygen is pumped under 2200 psi to two evaporator heaters which convert the liquid oxygen to large volumes of dry oxygen gas.

Main instrument and control panel is shown at the left. Back of it is the base of the rectification column. Plant utilizes the world's only free raw product—air. Plant operation primarily involves compression, expansion, condensation, distillation and evaporation.

This 1100 hp Clark natural gas engine and 5 stage battery of high pressure air compressors, shown below, is one of the key points for making liquid oxygen in volume production. As a by-product of this expansion engine—which is powered by the force of the high-pressure air as it expands in the engine—its flywheel utilizes a belt to drive a 44 kw G-E electric generator, which in turn supplies part of the plant's power and lighting requirements.



expanding industry supplied by Houston Oxygen Company's

Liquid Oxygen-Nitrogen Plant

Pure oxygen, nitrogen and argon gases also produced . . . pipeline supplies multiple industrial customers with oxygen . . . central system oxygen and acetylene lines for industrial plants.

In April, the Houston Oxygen Company of Houston, Texas, put in operation its new million dollar plant for the production of pure liquid oxygen and liquid nitrogen, and pure oxygen, nitrogen and gases play an important role in many phases of the petroleum, metaiworking, chemical, and other industries. A simplified flow chart of the modern plant and descriptive processing data are featured on the following page.

Oxygen Pipeline

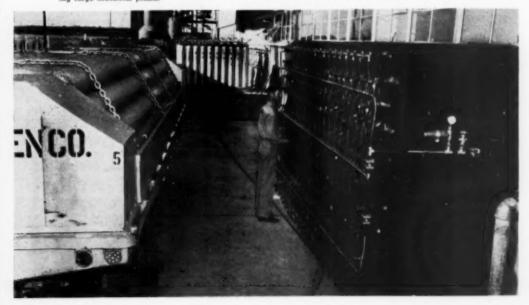
Part of the dry oxygen gas produced in the plant (of 99.5 per cent or better purity) feeds the new 3 in. Industrial Oxygen Pipeline which runs Southeast from the company's location in the Western section of Houston. Among the large companies supplied are the plants of Engineers & Fabricators, Inc. (manufacturers of heat exchangers, coolers, reboilers, condensers and other heat transfer

and pressure equipment), the Southwest Plate Division of Southwest Steel Products (fabricators of steel storage tanks, pressure vessels, etc.), Nowery J. Smith Company (galvanizing, electro-plating, steel bolts, etc.), Tyson Smith Company (makers of steel tanks, heaters, separators, treaters, etc.) and Wyatt Metal & Boiler Works (steel plate fabricators and erectors).

Central System Units

The economical advantages of in-

One of the fleet of large tube-bank trailers used by Houston Oxygen Company to supply large industrial users with dry oxygen gas. A bank of thirty 300 cu ft cylinders, which is delivered as a storage-bank unit to industrial users of moderately large quantities of dry oxygen gas, is shown in the background. Battery of manifolded oxygen gas cylinders at the right is used as a stand-by feed unit on the central system oxygen pipeline supplying large industrial plants.



stalling central system oxygen and acetylene lines within industrial plants using welding and cutting operations, are yet to be utilized in full measure. When the usual individual cylinders need no longer be handled, regulators and hoses no longer switched from empty to full cylinders, and lost production due to such delays no longer suffered, savings in labor costs alone will represent a direct contribution to customer's profits, without considering the greatly reduced hazard factors.

The use of such central system oxygen and acetylene lines within industrial plants will be greatly increased by this company's new facilities for providing customers (not served by their pipelines) with large banks of as many as 50 permanently placed tubes, each 20 ft long, for the storage of oxygen. Heretofore smaller storage banks were mounted on large, flat trailer-trucks; and when these emptied, they had to be towed back to the oxygen plant for refilling, meantime being replaced by similar equipment.

Liquid Oxygen Transportation

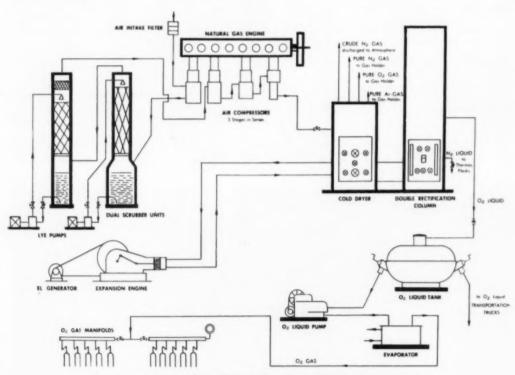
Houston Oxygen Company is now completing the building of a fleet of specially constructed tank-trucks to carry liquid oxygen under atmospheric pressure direct to the customer's permanently placed storage bank.

One of the trucks will tie a feed line into the customer's storage bank, and by using an evaporator and pump to convert the liquid oxygen into dry oxygen gas right on the truck, the customer's storage bank of tubes will be refilled.

These trucks will be used also to supply large and moderate sized users of industrial oxygen, each of which will be set up with a liquid oxygen storage tank and a converter unit to generate dry oxygen gas on their own premises, for use as needed. Thus, large batteries of steel cylinders or tubes otherwise required are eliminated.

Affiliate Plants Supplied

Officials of the Houston Oxygen Company are all officials also of a group of eight other affiliated companies. Largest of these is the Big



Simplified Flow Chart — Oxygen-Nitrogen-Argon Plant — Houston Oxygen Company

THE PROCESS—Compression, expansion, condensation, distillation and evaporation.

COMPRESSION—Air is filtered and taken from atmosphere by first stage of 5-stage compressor battery and compressed to 30 psi. Air is sent through dual scrubber towers (outside building) and delivered to second compressor stage and compressed to 115 psi. Compressed to 400 psi in third stage; 840 psi in fourth; and 2350 psi in fifth. After air leaves each

stage, it is cooled as it asses through a heat exchanger before going to the next stage.

EXPANSION—Air under 2350 psi goes to cold dryer, where moisture is frozen off under a temperature of —35 C. Cooled air leaves dryer divided into Part A (about 1/3 of volume)

Three Welding Equipment Company of Houston and Fort Worth and 16 other key cities. Houston Oxygen Company's new plant adjoins Big Three's new million dollar Houston plant, opened just last October.

As soon as the new fleet of liquid oxygen trucks is ready to roll, their plants at Orange, San Antonio, Corpus Christi and Brownsville, Texas, will discontinue producing oxygen gas. These plants will be converted for the storage of liquid oxygen produced at and shipped by trucks from the new Houston plant. Then, with the use of evaporator units and pumps, each plant will convert the liquid oxygen to dry

Officials of the Houston Oxygen Company, who put into operation the new million dollar liquid oxygen plant at Houston are: Altred K. Smith, President: Cyrus K. Rickel, Vice President; Harry K. Smith, Director; and Al Herstein, Secretary-Treasurer and General Manager. O. L. Rogers is Sales Manager; Harper Avis, Plant Superintendent; and Fred Stevens, Chief Engineer.

oxygen gas as needed to supply its area. Cylinder filling and delivery will complete operations at these points.

The company's oxygen plants at Fort Worth and Borger, Texas, and probably their plant at Tulsa, Oklahoma, will follow a similar pattern of conversion and be supplied from their Houston producer.



O. L. Rogers, Sales Manager, and Harper Avis, Plant Superintendent, examine main meter on the company's new pipeline recently placed in service.

and Part B. Part A is passed through heat exchanger and cooled to —150 C, then through a liquifying exchanger and cooled to —175 C. Air, still under 2350 pai pressure, passes through an expansion valve, where it is expanded to 75 pai just before line enters rectification column. It is this expansion which converts a high percentage of Part A air to a liquid. Both liquid air and remainder of gaseous air then flow into the rectification column.

Part B of the cooled air leaves the dryer at —35 C. Still under 2350 psi, it goes to a high pressure expansion engine. Pressure is expanded to 75 psi, which lowers its temperature to 165 C. Air passes through dual filters to remove any trace of oil picked up from the expansion engine, since oil traces would be highly dangerous in later processing. Part B air is then delivered to the same liquifying exchanger through which Part A air travels; but Part B is kept entirely separate from Part A. Part B air from expansion engine is cooled further to —175 C in liquifying exchanger and then enters rectification column.

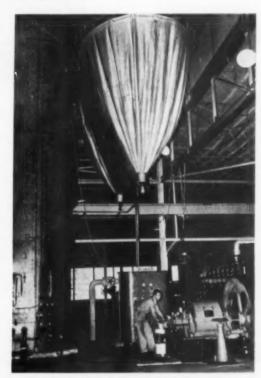
DISTILLATION—Rectification column functions as double column; lower portion being termed First Rectification Column; upper portion Second Rectification Column. Column contains a gel-absorber to trap and remove any trace of acetylene gas with which original air from atmosphere might be contaminarted.

Both parts of air enter first (lower) column. By a series of distillations the liquid air is separated into crude liquid oxygen and crude liquid introgen. Crude liquids are expended from 75 psi to 6 psi and both enter the second (upper) column where pure rectification takes place. This results in (1) a 99.7 per cent pure liquid oxygen (with temperature of —183 C), (2) highly refined oxygen gas, and (3) a "nearly pure" nitrogen gas in the second rectification column.

NITROGEN HIGHLY REFINED—Nitrogen gas is taken off and transferred to another rectification column within the main column structure. Here 99.9 per cent pure nitrogen gas and 99.95 per cent pure liquid nitrogen are produced. Nitrogen gas is returned to cold dryer unit before passing on to a nitrogen gas holder: pure liquid nitrogen is drawn off (with temperature of —196 C) and stored in thermos flasks for delivery.

ARGON GAS PRODUCTION—Portion of highly refined oxygen gas is drawn oil second rectification column and transferred to another column within the main column structure. It is liquified by a condensor and separated into oxygen gas and crude argon gas, latter being stored in a large argon balloon suspended under the roof of the building. Crude argon gas is highly purified (to 99.9 per cent) before being returned through the cold dryer unit and passing on to a pure argon gas holder. Crude argon gas residue is also returned to cold dryer and then discharged to atmosphere as waste.

Returning to second rectification column—the dry oxygen gas left from processing is drawn off and returned to cold dryer unit, where it is more highly refined to 99.9 per cent purity before passing on to a pure oxygen gas holder. LIQUID OXYGEN AND OXYGEN GAS—From second rectification column, liquid oxygen is also drawn off and transferred to 2 liquid oxygen storage tanks. Each tank holds liquid equivalent of 1,000,000 cu ft of oxygen gas. From these tanks the liquid oxygen is pumped under 2200 psi to two evaporator heaters which convert the liquid oxygen to large volumes of dry oxygen gas.



At left is the base of the rectification column; and at right the expansion engine, which plays such an important role in efficient volume production of pure, dry oxygen and nitrogen and argon gases. The crude argon balloon is shown in upper center.

Condensate Drainage Control

Increases Plywood Production for Savannah, Georgia, Plant



By HOKE B. SMITH

Superintendent Bradley Plywood Company Savannah, Georgia

Ten 3-ply veneer panels are bonded at one time in this steam heated hydraulic platen press.

Dried Veneer removed from one of the dryers is ready for bonding.

THE Bradley Plywood Company is located five miles from the heart of Savannah, Georgia. Although we do make a few specialized products for a limited number of old customers, our main business is the making of plywood panels for the wholesale trade. Much timber is used in the making of plywood that would not normally be used in the building and woodworking industry, such as sycamore, gum and other semi-hardwoods.

The logs are delivered to the plant by truck from the nearby forests and by rail from more distant points in Georgia. Very little except Georgia timber is used at the mill, but some African mahogany veneer is used in the manufacture of the more expensive paneling.

Before the manufacturing process begins, the logs are cut to the desired lengths and placed in a large vat for boiling overnight or until they are fully saturated with water to make them more pliable.

From the boiling vats they are

taken while still hot to lathes, capable of holding logs up to five feet in diameter, where they are trimmed down to almost perfect cylinders. On these same lathes, after all bumps, large ends, and other outside growth imperfections are removed, the actual formation of veneer begins. The log is revolved against a stationary blade that seemingly unwinds it as if it were a giant roll of paper in one continuous length.

Leaving the lathes, the veneer is carried by conveyors, still in one long piece, to the dryers where large shears cut it to the specified size.

Veneer Drying

We have two dryers each containing about 6,000 feet of 11/4 in. steam piping. These dryers are

each about fifty feet long with four decks. The veneer is fed into the dryers by hand. After the veneer is taken from the dryers and graded it is ready for final assembly into panels.

This first drying of the wood sheets is one of the most important processes in the manufacture of plywood panels. Uniform high temperature is required under complete control. The wood must be dry enough to handle and work with, but not dried to the point where it becomes brittle.

The drying time is determined by the thickness of the material being dried which in turn is determined from the desired thickness of the finished board. For the heavier boards, the wood may be shaved from the logs in onequarter inch thickness; for the lighter board it may be as thin as one thirty-second of an inch.

Bonding and Pressing

The final assembly of the plywood consists of placing these thin sheets of wood in layers with the grain running at right angles in alternate layers. The individual plys are run through rollers that spread a bonding cement on all surfaces. After passing through the cementing process, the plys are reassembled and sent to a ten-tier heated hydraulic press. Here, un-

der high pressure and intense heat, the final bonding of this laminated wood product takes place.

Heat Balance

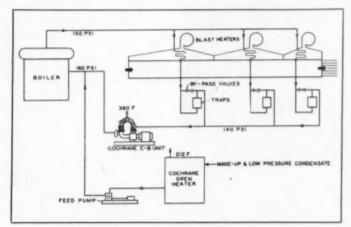
Steam at 150 psi for both the two coil-type tunnel dryers and the hydraulic press is generated by a 400 hp wood-waste boiler. Although some coal is used, fuel cost is not a problem. When the mill is operated full time, enough wood scrap is available to keep the boiler supplied. Steam is also used to heat water by direct contact for preliminary soaking of

the logs, to operate a small sawmill used with the plywood plant, and for comfort heating.

While condensate is not recoverable from all the processes, the steam utilized in the dryers and the press at boiler pressure of 150 psi, corresponding to 366 F, provides a considerable amount of condensate which, if allowed to flash to atmospheric pressure and temperature (212 F) would represent an appreciable loss.

In addition, and even more im-

(Continued on page 142)



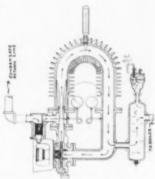
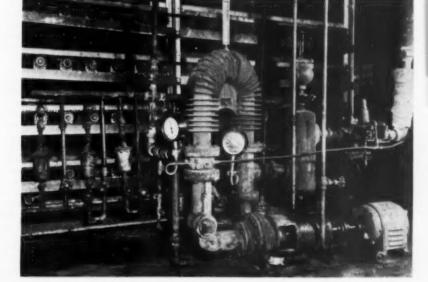


Diagram showing the flow of condensate through the Cochrane CB

In a typical installation, the Cochrane CB system handles the high temperature condensate, by-passing the low pressure and makeup system.



The Cochrane CB Condensate Drainage Control unit is installed between the two dryers. Note the four decks in the background.

For the plant engineer's notebook

V-Belt Drive Maintenance Tips

By C. J. BUSACCA,

Texrope Drive Department, Allis-Chalmers Mfg. Co.



Good example of a short center v-belt drive and proper belt rigidity is this Cumberland River Sand & Gravel Co. installation at Nashville, Tenn. Crushing roll, driven by two 25 hp induction motors, is used to reduce gravel for mixing with river sand for building construction.

THE best possible way to obtain trouble free, long-lived v-belt drives is to engineer and install them properly. Simple, regular maintenance will then insure continued fine service and long life. Proper engineering and correct installation are truly preventative maintenance measures. If the basic rules for engineering and installing a v-belt drive are followed, it will not be necessary to provide more than occasional belt take-up and inspection for wear of the belts or the sheave grooves.

The basic factors of drive engineering and installation which prevent the spending of excess maintenance time, costly repairs and down time are shown in Tables 1, 2, 3, and 4.

First abide by the rules of the v-belt drive manufacturers as shown in their catalogs. These simple rules are shown and include the use of no sheaves beneath the recommended minimum pitch diameters for each belt cross section (Table 1).

Secondly, the practical limits for operating a v-belt are between 1000 and 5000 surface feet per minute. Up to 5000 sfm the horsepower transmitting capacity of a v-belt drive increases but no appreciable gain in horsepower is possible beyond the 5000 feet velocity. Also, horsepower transmitting capacity falls rapidly beneath 1000 sfm (see Table 2).

The third basic rule of v-belt engineering is to remember that v-belt drive tables are based on a 180 degree arc of contact between the belts and the sheaves (Table 3).

High starting torques or peak load conditions, etc., should be considered when the drive is engineered, or premature drive failure from underbelting will result. Some of the service factors for various machines and loads are shown (Table 4).

Drive Installation

The second group of preventative maintenance tips which will increase v-belt longevity apply to the installation of the drive. The first factor to be remembered is that all standard v-belts will stretch up to 4 per cent during their operating lifetime and it is imperative that some means for maintaining correct belt tension at all times be included. Idlers, sliding motor bases and slide rails all permit the necesary lateral movement of the motor and placing of the idler to prevent belt sag and insure tension.

Be certain that all v-belts are aligned to prevent excess belt wear. Driver and driven shafts should be parallel and the belts operating perpendicular to the shafts. A straight edge will be helpful in obtaining this alignment.

After alignment, be certain that the motor and driven sheaves are close together so that the belts do not have to be pried into the grooves or rung from groove to groove. Prying the belts into or out of the groove with a bar or screwdriver will injure the inner driving cords of the belt and cause the belts to fail prematurely.

With the belts in position in the groove, the shafts parallel and the sheaves aligned, back the motor from the driven unit to obtain some tension and turn the drive by hand. Back the motor again until the belts seem tight and run for a few minutes to seat the belts in their respective grooves. Back the motor again to snug the belts (so they feel lively when thumped with the hand), tighten and operate. Always allow

for lateral take-up up to 4 per cent of belt length during the operating lifetime of the belt. This will permit maintenance of proper tension at all times.

Most manufacturers of v-belt drives agree that the best possible center distance for a v-belt drive is from one to one and one-half times the diameter of the large sheave. Besides being an obvious saver of floor space, the use of short cen-

ters means shorter belts, less possible belt stretch and less operating

Always install all new belts in a matched set both on a new drive and when making replacement. If older, stretched belts are used with new belts, the new belts, having a shorter pitch diameter, will carry a major portion of the load. Frequently then, a severe shock load or high starting torque will greatly

strain or break the new, shorter belts. The attempt to use older belts on a drive with new belts is false economy and poor maintenance technique in the long run.

Breaking In

Especially during the first few weeks of operation, the "breaking in" period, it is practical to watch a new drive carefully and keep proper tension. On drives lacking

TABLE 1.

RECOMMENDED

SIZE

DRIVING SHEAVE

	DRIVING SHEAVE						
Section	Minimum Pitch Diameter	Maximum Pitch Diameter					
^	3.0° 5.4°						
c	9.0"	Sheaves developing belt speeds in excess of 5000' per minute are not recommended.					
E	13.0° 21.6°						

TABLE 2.

(Quick Calculation Aid)
Belt Speeds in Feet per Minute

Sheave Pitch	Full Load Speed Rpm								
Dia. Inches	1750	1450	1160	860	725	695			
3 0 3 2 3 4 3 6 3 8	1375 1467 1559 1651 1742	1140 1216 1292 1368 1444	912 973 1033 1094 1155	676 721 766 811 856	570 608 646 684 722	54: 58: 61: 63: 69:			
4.0 4.2 4.4 4.6 4.8	1834 1926 2017 2109 2201	1520 1596 1672 1748 1824	1216 1276 1337 1398 1459	901 946 991 1036 1082	760 798 836 874 912	72: 76: 80: 83: 87:			
5 0 5 2 5 4 5 6 5 8	2293 2384 2476 2568 2659	1900 1975 2051 2127 2203	1520 1580 1641 1702 1763	1127 1172 1217 1262 1307	950 988 1026 1064 1102	910 947 983 1020 1050			
6.0 6.2 6.4 6.6	2751 2843 2934 3026 3118	2279 2355 2431 2507 2583	1823 1884 1945 2006 2067	1352 1397 1442 1487 1532	1140 1178 1216 1254 1292	1093 1129 1165 1202 1238			
7.0 7.4 8.2 8.6 9.0	3210 3393 3760 3943 4127	2659 2811 3115 3267 3419	2127 2249 2492 2614 2735	1577 1667 1848 1938 2028	1330 1406 1558 1634 1710	1275 1347 1493 1566 1639			
9.4 10.6 11.0 12.0 12.4	4310 4860	3571 4027 4180 4559 4711	2857 3222 3343 3647 3769	2118 2388 2479 2704 2794	1786 2013 2089 2279 2355	1712 1930 2003 2185 2258			
13.0 13.4 13.6 13.8 14.2	****	4939	3951 4073 4133 4194 4316	2929 3019 3064 3109 3200	2469 2545 2583 2621 2697	2367 2440 2476 2513 2586			
14 6 15 0 15 4 16 0 18 0		:::::	4437 4559 4680 4863	3290 3380 3470 3605 4056	2773 2849 2925 3039 3419	2659 2731 2804 2913 3278			
18.4 20.0 22.0 24.0 25.0				4146 4506 4957	3495 3799 4179 4559 4749	3350 3642 4006 4370 4552			

TABLE 3.

ARC OF CONTACT-CORRECTION FACTOR

Arc of Contact = 180° - $\frac{60 (D-d)}{C}$

ARC	180"	170°	140°	150"	140"	130"	120"	110"
Fector	1.00	.98	.95	.92	.89	.96	.83	.79

TABLE 4

SERVICE FACTORS

Following are some of the more general applications with corresponding Overload Factors. (Revening service requires an additional 1.2 overload factor.)

Agitators, paddle-propeller	
Brick and Clay Machinery	
Buk. y Machinery	
Сотреного	
Conveyors	
Crushing Machinery	
Fans and Blowers	
Flour-Food and Coreal Mill Machinery	
Generators and Excitets	
Laundry Machinery	
Line Shafts	
Machine Tools	
Mills	
Oil Field Machinery	
Paper Machinery	
Printing Machinery	***
Pumpil	***
Rubber Plant Machinery	***
Screens	***
Textile Machinery	***

The Service Factor relected depends on peak and shock load in excess of 100 % full load. Where shock and peak loads are light, use the lower Service Factor—for severe loads, use the higher Service Factor.

TABLE 1—All belt sections, depending upon their dimensions, have an easy bending arc. Any attempt to bend the belt around too small a sheave will cause internal friction, generate heat and cook the life out of the belt.

TABLE 2—Where possible, use sheave diameters which will keep belt velocity near the upper limit and, therefore, the number of belts on the drive at a minimum.

TABLE 3—Ratios and centers affect the contact arc causing variations from one drive to another and should be considered to be certain that the drive is designed to handle the specific conditions.

TABLE 4—These basic manufacturers' recommendations will help increase v-belt life expectancy and are the basic rules to be followed when any v-belt drive is engineered.

proper tension, "crack-the-whip" action can easily occur and snap the belts. This most frequently happens when starting the motor or at peak loads. Extra slack is suddenly taken up and the portion of the belt last to be whipped taut is frequently snapped. This also is a partial explanation of how slack belts stretch more in service than taut belts. The more hours a v-belt operates each week, the more regular should be the periodic inspections of the complete drive and the belt tension in particular.

When installing a v-belt drive it is practical to install a guard not only to protect the machine operator but also to protect the drive. When a drive must operate in an oil spray, a splash guard will protect the belts from their number one enemy, oil. So protected, belt life

MUPHTARY CHRUPY CHECK LICT

will be increased many times. If the betts deteriorate from excess oil, when replacement is necessary, buy oil resisting or oil proof belts with a Neoprene cover or body. Neoprene is a synthetic rubber not affected by oil or grease. The cost is slightly higher than a set of comparable standard belts, but they will long outlive standard belts in an oily or greasy atmosphere and will be well worth the increased original price.

Guard Installation

Guards should allow proper air circulation around the drive but at the same time protect the drive from falling foreign material, abrasive dust, or oil and grease which may wear not only the belts but the grooves of the sheave as well. Be certain when installing any guard

that bolts or parts of the guard cannot touch the belts. If the belts should snag or catch on protruding bolts they will snap and break or be badly scuffed and weakened. Guards should always be sufficiently large to allow normal belt operation.

Conditions Change

Sometimes the original conditions under which a drive operates change and the horsenower required is then more than the drive is able to handle. This condition would normally mean shortened belt life or the necessity of purchasing a larger drive. However, most belt manufacturers now sell higher capacity type belts generally rated 40 per cent, above standard belts. If the load increase is up to 40 per cent the installation of the new, high capacity belts on the original sheaves will mean longer belt life without the cost of purchasing the two sheaves as well as the belts. Also, where the space available limits the size of the drive, it may be possible to substitute the higher capacity belt. Again, if at the time of installing a drive it is known that the power necessary may increase with plant expansion or change in the material to be machined, it is practical to prepare for this condition by installing the belts with 40 per cent greater capacity originally, though all the available power transmission capacity is not immediately necessary.

Operative Maintenance

The actual operative maintenance is the simplest if the drive has been correctly engineered and installed. It consists of regularly scheduled check-ups to maintain proper tension, check belt wear (signs of scuffing, slip burns, oil swelling and abrasive action on the belts). sheave wear (smooth, no ridges or chipped grooves), shaft and sheave alignment, and conditions under which the belt must operate (temperature above 140 degrees, oily atmosphere, oil baths, spark danger, changed load conditions and necessity for fixed centers).

Keeping a regular inventory similar to the inventory check list shown will aid you in preventing premature drive failure and in being prepared for the possible failure of any drive in the plant.

SE SEPARATE SHEET FOR FACE	H DRIVE IN YOUR DEPARTMENT)	Not later than
scatton and number of machine		
ind of driven machine	MP of Mon	The state of the s
		and number of helts on drive
1. Present Condition of Drive	3. Present Condition of Sheaves	OPERATING CHARACTER- ISTICS
BELT TENSION	GROOVE WALLS	Are sheaves ever removed?
ADJUSTMENT DEVICE	Smooth, no ridges in broken	Present sheaves OK here; no
OK, drive it so equipped	parts	(regiserally removed.
Drive has more	Need regrossing or replacing because of accident or excessive	Sheaves changed or remove occasionally for speed variation
BELT TENSION	Secretary on account on excession	or machinery overhaul etc.
OK Too Slack	Remark	Machine would be more of
Elegan Colonia		
SHAFT ALIGNMENT		5. Beit Engineering
Shafes Out of Parallel	A Dalan Familianaian	These belts operate in
SHEAVE ALIGNMENT	4. Drive Engineering	TEMPERATURE
Sheaves out of Line	SHEAVE DIAMETERS	C degrees.
And the second s	OK for belt section used Smaller than recommended	(If more than 130 degrees out grees need of heat resisting below
Remarks	by quantacturer. (Minimum rec-	OILY ATMOSPHERE
Shortson	commended charges dismospher	CSuggests need for Oil Resis
Manager III	A-section, 3.0"; B-5.4"; C-9.0"; D-15.0", E-21.6".)	ing belts)
2. Present Condition	CENTERS	OIL BATH Guggests need for Oil From
of Boits	OK — Short as practicable.	(Suggests need for Oil From belts)
Beles are in good condition	Could be shotter.	SPARK DANGER ZONE
Beles show segme of	NUMBER AND SIZE OF BELTS	Suggests need for Sensic Resisting belts)
SCUFFING	Appears OK	HEAVY DUTY, RESTRICTED SPACE OR FIXED CENTER
Often carried by bent guards protruding bolts, etc.)	Should be changed	SPACE OR FIXED CENTER
SUP BURN	BELT SPEED	beles)
(Often caused by slack ten	☐ Appears OK ☐ Too slow	NONE OF ABOVE CONDITIONS
rion or oraquid)	Tour last	(Standard belts will do th
OIL SWELLING	ARC OF CONTACT ON	job)
(Often caused by faulty	SMALLER SHEAVE	Remarks
splanh guards)	Seems small, suggest checking	
ABRASION		
(Often caused by faulty dust puards, slack tension)	TO BE FILLED OUT BY ENGINEE	RING DEPARTMENT
How long have present belts	This drive is generally okay on it	es present assignment.
been on this drive!	li much New helix Cormite	ins of Shalt alignment serves Guards
Broarks	Drove as a vetorie should be re-er	nginested and replaced
The second secon	Signer/	Date

ELECTRICITY and ELECTRIC POWER

Part 4-Kilowatts and Kilowatt-Hours

Volts, amperes and watts; a-c motors and controls; and transformer application have been previously discussed. This is an explanation of electrical demand and energy.

By ROY W. WAGES

Division Industrial Power Engineer Georgia Power Company Columbus, Georgia

FRIENDS and acquaintances in industrial plants often ask "Exactly what is meant by demand and why do we have it in our electric rates?" This is not an easy question, for if the one attempting the answer is not careful, his reply will only offer additional confusion.

Even the words normally used to define demand and energy are confusing. Only a most fundamental explanation will serve to enlighten most of those who ask the question.

The term almost universally used to define or describe the ability of a machine to do work is the word horsepower. When work is done at the rate of 33,000 foot-pounds per minute, the machine is said to be exerting one horsepower.

The unit of electric power is called watt and the value of the watt is .001341 horsepower. Conversely, one horsepower equals approximately 746 watts. The word kilowatt means 1000 watts, the prefix kilo (borrowed from the Greeks) denotes one thousand. Thus, one kilowatt is equal to about 1.3 horse-

Here is the confusing part about the whole business: a kilowatt denotes "a rate of consuming electrical energy"; a kilowatt is not a unit of energy itself. The unit of electrical energy is called a kilowatt-

A kilowatt-hour is (if we could, for a moment, think of electricity as something that we could, like water, put in a bucket) a quantity of electrical energy-a "bucketful."

A kilowatt is the rate, or speed, at which those "bucketsful" of kilowatt-hours are consumed. One term involves time and the other one doesn't; and, more confusingly, the term that involves time omits the word hour, while the word that denotes quantity employs the appendage "hour"-a unit of time. Personally, I think we would be better off in the long run if we would coin a couple of new words to be used in lieu of kilowatt and kilowatt-hour. But it is rather difficult to get timehonored usages changed. So, let us firmly fix in our minds that kilowatt-hour is a quantity of electric energy (like a bucketful); and that kilowatt is a rate or speed at which those bucketsful are consumed. With that point clear, let's leave kilowatt and kilowatt-hour for a moment and talk about another misunderstood, and often misused

Demand

Webster defines demand as "to require"; "to have urgent need for": "to summon."

In electrical phraseology we use the word demand to signify the maximum requirement of electricity of a piece of electrical apparatus during any given interval of time. That is to say that if, for example, a house has twenty 100-watt light bulbs to be supplied with electricity: and were those twenty 100-watt bulbs to be turned on all at one time, the "requirement" or "demand" of the house would be 20 x 100 = 2000 watts or 2 kilo-

Now, if those light bulbs were

consume 2 kilowatt-hours: 2 kilowatts x 1 hour = 2 kilowatt-hours.

That is a basic example of demand. (Personally, I think the word requirement would be much more readily understood.)

Another way of looking at it would be to say that the house used, when all twenty 100-watt bulbs were on, 2 kwh per hour. Then, if the lights were left on for one hour, the total amount of energy consumed would be 2 kwh. Had the lights been left on for two hours, the amount of energy consumed would be: 2 kw per hour times 2 hours = 4 kilowatt-hours.

Basically, then, as was pointed out in the preceding paragraphs, demand is the amount of energy (kilowatta) required during any given interval of time.

Demand Cost

Now that we've explained the difference between kilowatts and kilowatt-hours, why is electricity delivered to our plants not only in kilowatt-hours (so many bucketsful) but also in kilowatts (bucketsful per hour)?

That is an important question about a subject of utmost interest to men responsible for the use of electricity in industrial plants. Perhaps the best way to answer the question would be to compare the electrical usage of two industrial

Let us now examine the electrical load of two industrial plants each of which has the same kind of machinery and makes the same product: the only difference being that one plant is exactly twice the size of the other. One has 1000 hp and the other has 2000 hp. Now, let us convert that horsepower to kilowatts so that we will be dealing in electrical terms. Then, Plant No. 1 would have 1000 x 0.75 = 750 kw; and Plant No. 2 would have 2000 x 0.75 = 1500 kw.

Let us further assume that Plant left on for one hour, they would No. 1 operates 320 hours per month

The Demand Charge is at Every Turn

The industrial plant owner pays a demand cost on a lot of other items besides his electric bill. But because the electric bill faces him as cash on the barrel head each month, he is more conscious of it there than elsewhere.

For example, his plant truck, used for miscellaneous handling of freight and repair materials, has to be big enough to handle the heaviest individual load. Perhaps the truck only averages a few hours operation per day, and most of the loads are small (less than one ton), but occasionally a 3-ton piece of equipment must be hauled. Obviously the owner has to pay for and maintain a big truck—even though he normally could get by with a 1-ton "pick-up."

Even the roof over his building and the sump pump in his basement must be adequate to the needs of the infrequent rainstorm rather than normal weather.

In fact, demand charge faces the investor at every turn. Every piece of equipment he buys must be sized and designed for the maximum requirement, rather than the average. His total plant investment could be enormously reduced if normal, average operation could be constantly maintained. But unfortunately few industrial processes can be so exactly controlled: operation is subject to spurts and jumps—and all rises above average cost money.

and that Plant No. 2 operates 160 hours per month. Over the month, then, both plants would use exactly the same amount of energy: Plant No. 1: 750 kw x 320 hours = 240,000 kwh; Plant No. 2: 1500 kw x 160 hours = 240,000 kwh.

While the same amount of energy used by the two plants is exactly the same; and, while the production of the two plants is exactly the same; the demand, or requirement, for Plant No. 2 is exactly twice that for

Plant No. 1. Therefore, whether the two plants manufacture or buy their electricity, the electrical power plant investment for Plant No. 2 will be approximately twice that of Plant No. 1. Thus the fixed charges would be approximately twice as much for one plant as for the other. These fixed charges include taxes, interest, insurance and cost for replacement.

As we review these facts and study them in the light of proper

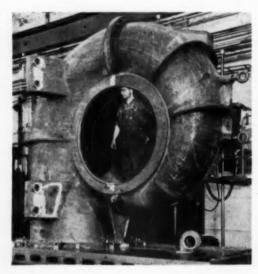
accounting, it is readily seen that the cost of electricity for Plant No. 2 would be more than the cost of electricity for Plant No. 1; because the fixed, or capital, charges must be included in the cost of the product; and those capital charges remain the same, regardless of the hours use of the equipment.

Thus to properly account for the fixed charges on plant investment, it was mandatory that demand be woven into the cost of electric power. For it may be clearly seen from the example just cited, that if cost were based on the energy alone, the cost of electricity to Plants 1 and 2 would be exactly the same; and that, of course, would be in contradiction of the sound and necessary theory of fixed charges.

That is the answer to the question so often posed, "Exactly what is demand, and why do we have it in our electric rates?"

Demand Meter

Demands are metered, or measured, by a device called a Demand Meter which operates as a part of, or in conjunction with, a regular watt-hour meter. The manner in which both demand and energy are measured by demand meters and watt-hour meters will be discussed in a subsequent article.



Giant and Pygmy-Same Model Pump

Despite the vast difference in size, both of these Fair-banks-Morse pumps are of the same model, the largest and the smallest of their type.

The giant is a 54 in. angleflow pump with a massive casing twice the height of a man and has a top capacity of 80,000 gpm. It is being built for service in the Brownsville, Texas, irrigation district. Driven by a 420 hp Fairbanks-Morse diesel, it will pump 86,000,000 gallons of water per day from the Rio Grande River into irrigation channels.

The pygmy is also an angleflow pump. This 8 in. unit stands 22 in. high and can handle 800 gpm. The angleflow pumps are designed for large volume at compartively moderate heads and are used in drainage, irrigation, water supply, screened sewage and many other services.

Leaders in every Industry choose VU

More and more ... in industry after industry ... you will find C-E Vertical-Unit Boilers (Type VU) establishing the standards for efficient steam production.

In Textile Mills, for example . . . where steam must be reliably available for process work . . . many of the industry's leaders, as evidenced by the representative list below, are users of Type VU Boilers.

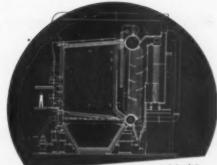
Why list only large companies when VU Boilers are also used by many smaller textile mills? Because such names form a significant guide for a prospective boiler buyer, in the same sense that the buying decisions made by operators of large truck fleets can be a reliable guide for the man who wants to buy a single truck. Moreover, big companies buy boilers frequently . . . therefore their experience is always up to date. And they buy them for plants in many locations, using many different fuels. Thus they have the breadth of experience that is required for making the soundest equipment selections.

So if you need steam — from 10,000 to 350,000 pounds per hour — remember that leading companies in every industry are profiting from the advanced design . . . sound construction . . . reliability . . . of C-E Vertical-Unit Boilers.

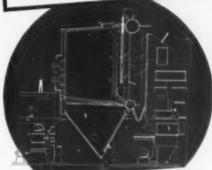
Typical Leaders in the Textile Field that have purchased C-E Vertical-Unit Boilers for one or more mills

American Thread Company American Viscose Company American Woolen Company, Inc. Bancroft & Sons Company Bigelow-Sanford Carpet Company Burlington Mills Corp. Cannon Mills Company Celanese Corporation of America Cone Mill Corp.

Congoleum-Nairn, Inc.
Dan River Mills
Goodall-Sanford, Inc.
Mohawk Carpet Mills, Inc.
Standard-Coosa-Thatcher
Company
Textron, Inc.
West Point Manufacturing
Company



VU-50 Boiler fired either with pulverized coal using C.E. Raymond Bowl Mills, or all as an alternate fuel. Capacity is 100,000 lb of steam per hr. Steam pressure is 200 psi; steam temperature is 500 F.



VU-50 Bailer fired with pulverised coal supplied by C.E. Raymond Bowl Mills. Capacity — 150,000 lb of steam per hr; steam pressure, 600 psi — temperature, 700 F.



VU-10 Boiler fired with all ar gas. Capacity of this unit is 40,000 lb of steam per hr at 420 psi and 600 F. VU-10 capacities range from 10,000 to 60,000 lb of steam per hr. They may also be fired by spreader, underfeed or chain grate stakers.



COMBUSTION ENGINEERING - SUPERHEATER, INC.

200 Madison Avenue, New York 16, N. Y.

8-572-A

ALL TYPES OF BOILERS, FURNACES, PULYERIZED FUEL SYSTEMS AND STOKERS: ALSO SUPERHEATERS, ECONOMIZERS AND AIR HEATERS

SOUTHERN POWER & INDUSTRY for JUNE, 1952

89

Mining company reports on

Renovating Old Cast Iron Pipe





THE OLD AND THE NEW—Corroded and encrusted iron pipe and the same pipe saved for further use by lining with Transite. New pipe retains salvaged strength of the old metal and receives corrosion resistance and added strength of Transite.

WHEN renovating old cast iron pipe, a mining company found that wood lining had a tendency to creep past pipe joints, making the removal of a section very difficult.

Translation and misches and mi

The walls of the cast iron can be worn away as much as one-third and still be usable. It makes no difference if the inside is rough and deeply pitted. Cleaming out any loose material is all that is necessary to make the cast iron pipe ready.

Then a length of new Transite pipe is inserted, and cement grout is forced up between the old and the new pipe. Cement fills in the worn parts of the cast iron and seals the cast iron and Transite into one pipe unit.

Bitumastic enamel sagged or flowed off if left out in the hot sun, and both this and vitreous enamels were easily chipped off. Rubber lining had also been tried but it also chipped if hard or cut if soft. Furthermore, these materials added little if anything to pipe strength.

Experimental Methods

In their first attempt to line metal pipe with Transite, the mining company tried a slip fit. The outside of the Transite and the inside of the metal pipe were machined to very close tolerances. The Transite was then buttered with white lead and slipped inside the metal pipe. This was successful but it was time consuming and costly.

They then tried a cast iron pipe split lengthwise into halves. The first half was placed in a horizontal position so it formed a cradle. After buttering it with grout the Transite pipe was laid inside. Then the Transite was coated with cement and the other half of the pipe

placed on top. This was successful but not economical.

In another experiment, Transite was placed inside the cast iron in vertical position. Then grout was pumped between the two. However, the grout was pumped downward. By reversing the pumping arrangement, the company arrived at the method now used.

Assembly Equipment

Current equipment consists of a base, a shrink head, and a pump with attachments for mixing and pumping the cement grout. The cast iron base is a disk surrounded by a circular trench which, in turn, is surrounded by a flat ring pierced with bolt holes. Disk supports the Transite pipe; the trench holds the cement grout; the flat ring supports the cast iron pipe.

In assembling, the Transite rests

(Continued on page 141)

This method and special equipment for renovating old cast iron pipe in a mining company operation were described in The Process 'Recetalite,' a publication of John-Manville.

User Reports ARMSTRONG "UNIT TRAPPING"

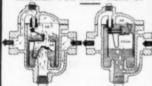
cut his fuel bill

20%

and speeded heat-up

15%

"BLAST" TRAPS PROVE TO BE ANSWER FOR FAST HEAT-UP



THERMIC OPEN

THERMIC CLOSED

Where steam is turned on and off periodically, blast traps give really fast heat-up, provided accumulated air and condensate is pocketed and will be pushed out ahead of incoming steam. A large auxiliary thermic vent in the bucket opens when the trap is cold, letting air whistle right through trap. When trap reaches 210°F the thermic vent closes and trap operates as a standard trap (see drawings above). Blast traps are ideal for single pipe coils, small an and-off unit heaters, on-and-off multiple coils, drip points, etc. See page 39 of The Steam Trap Boat.



Experience of Greenhouse Owner Points Way to Greater Efficiency in Any Plant . . .

THE problem of operating steam heated equipment efficiently is basically the same whether you operate a greenhouse, a refinery or a food processing plant. That is why the experience of Reiss' Greenhouses, Minneapolis, should prove of interest and value to you.

By replacing old, inefficient steam traps on heating piping with an individual Armstrong "blast" trap on each coil, Reiss' cut its fuel bill exactly 20% and speeded-up heating of cold coils by 15%. This benefit was gained solely because Armstrong traps drain condensate and air from steam heated units as fast as it accumulates and without leaking steam. In Reiss' case the "blast" traps described at the left were particularly beneficial, and may be in your case. For complete information call your local Armstrong Representative, or write:

ARMSTRONG MACHINE WORKS 806 Maple Street, Three Rivers, Michigan



You Get More Out of Your Fuel When You Use Armstrong "Unit Trapping"

SEND FOR YOUR FREE COPY
OF THE 44-PAGE
ARMSTRONG STEAM TRAP BOOK!

Complete data on selection of traps for all types of equipment plus installation and maintenance recommendations, trap list prices and physical data.



JUST CLIP THIS TO YOUR COMPANY LETTERHEAD AND MAIL:
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Please send me The Steam Trap Book.

Name

Title.

Electrical Maintenance in Diesel Plants

These preventive maintenance suggestions deal with diesel engine driven generators; exciters; motors for auxiliary drives, with their associated controls; and switchgear.

By O. L. OSCARSON

Chief Application Engineer Electric Machinery Mfg. Co.

ELECTRICAL equipment properly applied and properly maintained, will provide many years of trouble-free service. Obsolescence, rather than wear, is a common reason for replacement or retirement of electrical apparatus.

Bearing failure, usually due to improper lubrication, is a common source of trouble. Some types of bearings need attention only at 5-year intervals. This sometimes leads to similar infrequent attention to other bearings and to subsequent breakdown. On the other hand, over-greasing may be worse than under-greasing.

Stator coil failure is another common type of trouble. Overloading and improper ventilation, together with accumulation of oil, dirt, and moisture, all contribute to coil breakdown. Too frequent starting or too prolonged starting periods should be guarded against.

This all emphasizes the necessity for blose checkups to see that proper attention is given these machines. Keep the machines clean, cool, dry, and properly lubricated; avoid excessive vibration, and thus obtain the service life which the manufacturer originally built into the equipment.

Systematic Maintenance

Obviously, only actual operating experience can determine what portions of the following recommended maintenance practices are usable and which must be modified to fit specific plant conditions. However, these suggestions can serve as a basis from which a practicable start may be made.

A comprehensive maintenance schedule, rigorously followed, will prevent many shutdowns. A schedule may seem unnecessarily formal. However, if a "hit or miss" casual inspection is followed some units will be checked often and some rarely, if at all. A suggested program, for rotating equipment, which must be modified to fit individual conditions, follows:

ROTATING EQUIPMENT MAINTENANCE

Weekly

Feel machine for evidence of vibration, listen for unusual sounds indicating rubbing of mechanical parts; check presence of moisture or unusual amount of dirt, dust, oil, or grease. Clean with low pressure (30 psi) air if necessary. Check for presence of scorched odor indicating excessive temperature and possible insulation damage.

Feel bearing housings of sleeve bearing machines for excessive temperatures or vibration; check oil level. Oil if necessary, being careful not to over-oil. Check operation of oil rings. Check oil seals and see that oil is not being sprayed or thrown on stator coils.

On anti-friction bearing units, feel the housings for vibration and excessive temperatures. Listen for grating or rumbling noise which may indicate bearing failure.

Examine commutators or slip rings for signs of sparking or unusual surface conditions. If roughness or black spots are developing, clean with chalk stone.

If the above inspection indicates any critical operating conditions, shut unit down for thorough inspection and repairs.

Quarterly

Check bolted connections, brush pigtail connections, cable connections, brushholder and brushholder studs for tightness.

Check brushholder clearance to

commutator or collector rings, check brushes for proper freedom of movement, check brush pressure. Replace worn, chipped or cracked brushes, sanding in the new ones to fit the curved surface.

Check field coils to see that they have not dried out and become loose.

For ball bearing motors on continuous service, add lubricant, being sure to get some new grease to the balls or rollers. Be careful not to overgrease. (This does not apply to sealed cartridge bearings. Follow manufacturer's instructions.)

Check oil wells, on sleeve bearing motors, for sludge or dirt. Flush and refill if dirty.

Check coupling alignment on flexibly coupled units.

Check belt tightening rails on belted units. If all adjustment is used up, shorten or replace belts. Check geared units for gear wear and back-lash.

If machine is dirty, blow out with low pressure air. If coils are oily or greasy, wipe off clean with solvent.

Annual

Check and record air gap at four points at both ends of machine. Compare with previous readings. Air gaps should be equal within 10%. Examine surface of rotor for any evidence of rubbing.

All bearings (except sealed cartridge type) should be removed,





The facts are these:

A large southern chemical company about a year ago was up to capacity on their boilers. New process units were being added, requiring more steama new boiler seemed inevitable.

About that time they began replacing their old-type traps and bleed-off valves with Yarway Impulse Steam Traps and Strainers. Today, even with the new process units added, their daily steam consumption is nearly 100,000 lbs less than a year agothe superintendent gives Yarway Impulse Traps credit for the saving.

Yarway Impulse Traps are designed to insure sending the most premium B.T.U.'s at top temperature into your product or process to get equipment hotter sooner and keep it hot!

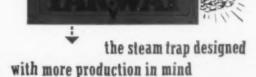
Yarway's have 11 other advantages, too-such as small size, low maintenance, low cost, and availability from over 200 Industrial Distributors.

Write for Bulletin T-1740. Or for steam trap advice, call on your nearby Yarway * service engineer.

YARNALL-WARING COMPANY

Home Office: 116 Mermaid Ave., Philadelphia 18, Pa.

Southern Representative: ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.



cleaned, and inspected; defective ones replaced. Repack grease lubricated bearings.

Check insulation resistance with a Megger and compare with previous values.

Check for loose or broken squirrel cage bars on cage motors. Examine commutators for high, low, or loose bars. Check riser connections. Check V-rings for tightness. Undercut mica if necessary. Check slot wedges to see that they have not dried and loosened. Clean thoroughly between the risers, around collector rings, etc. If rings or commutator are eccentric or spotted, turn true.

Check coil lashing or banding; check for evidence of coil loosening or shifting.

Clean all coils thoroughly, first blow off with air (not over 30 psi pressure) then wash with carbon tetrachloride, if necessary, to remove oil. Use carbon tetrachloride sparingly, and in a well ventilated place. Wipe coils thoroughly as otherwise insulation may be softened and damaged. Be particularly sure that junction of coil and core is clean. Many coil breakdowns occur at that point. Examine coils for evidence of brittleness or cracking. Clean all air passages.

Check brushholders on d-c machines to see that they are all set at the proper angle, that they are properly spaced, and that the brushes are set at the neutral point on the commutator.

Biennial

Every two years dismantle machines completely, and clean thoroughly. Measure phase to phase resistance; also measure field coil resistance. Dip and bake rotors, revolving armatures, field coils, and stators which can be so handled. Stators or rotors which are too large for dipping should be given a good spray coat of air drying varnish.

ELECTRICAL AUXILIARIES

There are various electrical devices associated with rotating equipment in a diesel electric plant; for instance, motor starters, generator switchgear, transformers, etc., etc. Possibly no one inspection system will suffice for all of these items.

Motor Control

In diesel plants it is likely that most motor starters will be reasonably close to the motors they control, rather than located in a group in a load control center. These controls should be inspected during the quarterly motor inspection and checked off on the same inspection sheet as the motors.

Excessive heating would be evidenced by charring of coil insulation or discoloration of metal parts. This could be caused by a broken shading coil permitting chattering of the contactor armature, rust on

the surface preventing accurate seating, or binding or distortion of the contactor assembly. Check for gummy bearings, dirt deposits, or dripping liquids. Corrosion or worn mechanical parts may prevent proper clasing.

Excessively worn contact fingers or springs which have lost their temper may result in poor contact or insufficient contact pressure, and subsequent heating. Contacts may be fairly rough without impairing their current carrying capacity, although any protruding tips should be filed off. Ordinarily contactor tips should be replaced if half their volume has been worn or burned away. Close contactor manually, with circuit de-energized, to see that all contacts close and open together and that, in closed position, springs hold contacts firmly together. Check for excessive wear of mechanical parts.

Check arc chutes and all shunts. Go through starting, operating, and stopping cycle to see that arcing is not excessive.

Oil immersed starting contactors should also be checked for oil level and for the formation of oil sludge.

See that push buttons operate freely and that the overcurrent trip devices are mechanically operable.

If ambient conditions of starters and the motors they protect differ widely during seasonal temperature changes, it may be necessary to change thermal elements regularly in order to protect the motors properly.

Switchgear

Most switchgear in diesel plants is equipped with oil circuit breakers. These breakers should be checked quarterly for oil level, sludge, and mechanical condition of trip devices.

Follow manufacturers' instructions with respect to voltage regulators and similar specialized devices.

All controls should be given a thorough inspection annually. In addition to the quarterly inspection, the line voltage and control voltage should be checked for one operating cycle. All overcurrent, undervoltage, and similar protective relays should be checked to see that they operate at the desired values.

Record forms constitute an important part of the preventive maintenance program.

LOCATION DATE				APPLICATION			REMARKS			
4										
3										
Z										
1									6	
HP-KVA	PL. RPM	PHASE	CYCLE	VOLTS.	FL, AMPS,	BERIAL NO.	MI	rgin.	TYPE	PRAME
ORDER NO DATE				CONNECTION DIAGRAM			TEMPERATURE RESE 'C.			
MPUB. ORD. NO.				NO			ARM FIELD			
INST BOOK ?	90).					BRUSHES			CONTR	IOL #
INST BEAK NO. BEARINGS-TYPE				NO.			MFGR.			
FRONT END NO			SIZE			TYPE				
SHAFT END NO			GRADE			INST. BOOK NO.				
SHAPT EXTENSION			MFGR			CONN. DIA. NO.				
DIA LENGTH				CAT. NO.						
							-			
KEYWAY X X			OVER							



Which of These Useful First-Aid Items Does Your Plant Need?

Described below are seven steam condenser specialties developed by Conseco engineers to simplify maintenance and step up performance.

Wizard Injector • Condenser tubes are subject to corrosion and crosion which may develop small leaks in the tube walls. To plug these leaks while the condenser is in operation, Conseco has produced the Wizard Injector. Operated by steam, this device introduces a special compound into the inlet circulating water which seals the leaks; avoids shutdowns between normal inspection and cleaning periods.



Wizord Injector

2 Air Erosion Eliminators • This simple apparatus, perfected by Conseco, completely liberates air from water before it enters the tube. It consists of perforated plates which induce turbulence in water as it passes through perforations; may be fitted in condensers having one, two or more passes.

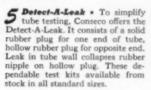
Plewrites • In installations where it is impractical to fit an Air Erosion Eliminator, air erosion of the tube inlets can be combated by the use of Flowrites, sometimes called "inserts" or "wearing sleeves." They serve as replaceable wearing sections; are fitted to the inlet ends of tubes for distances depending on length of attacked tube section.



Dissiller of vertices stars

Plugs for Condenser Tubes

• Use of right plugs will help keep condensers going until there is time for a complete overhaul. Conseco engineers have developed plugs of machined fiber which give full satisfaction. They are installed with light hammertan.



6 Conco Gun • For cleaning inside tube surfaces of slime, algae or soft scale deposits Conseco recommends the hydraulically operated Conco Gun and Plug. Trigger releases a jet of water which forces a metal spring leaf plug through the tube. Plugs come in all standard tube sizes.



Fiber Plug



Detect A.Legi

II.

Conco Gun and Pluas

Bems 1, 4, 5 & 6 in stock for all standard tube sizes. Items 2 & 3 MADE TO CROSS FOR QUICK DELIVERY, now material held in stock.

WRITE FOR BULLETINS—It will pay you to get further information about these first-aids to continuous condenser operation. Check items of interest and we will send descriptive bulletins.

CONDENISER

SERVICE & ENGINEERING CO.

HOBOKEN NEW JERSEY!

tools and methods for repairing

Damaged Conveyor Belting



Adapted from comments by Newell Perry, Beiting Engineer, The Thermoid Company

Suggestions on repairing gouges . . . holes . . . longitudinal and transverse rips . . . long deep cuts which go through to fabric.

A difficult repair job near belt edge is shown at the left. Bottom half of portable vulcanizer is placed under belt. Only very large users of conveyor belting will find it necessary to vulcanize their own belt patches and splices.

To secure maximum service life out of conveyor belting, repair all belt damage as soon as it is discovered. Belt fabric exposed to weather will absorb moisture if the protective cover becomes damaged and may even become scaked. In warm weather, this condition leads to mildew and rot. Immediate repairs not only prevent the spread of damage, with its threat of premature failure, but also keep out the water which is the natural enemy of any conveyor belt.

To mend long and deep cuts which go through to the fabric, open the cut, clean out all dirt, and cement the cut closed, allowing cement to dry thoroughly before the belt is restored to service.

Where bits of torn cover leave exposed spots with only slight damage to the fabric, remove the loose ears of cover stock by carefully cutting a curved and beveledged area around the spot; then sand the edges, apply cement, allow it to dry, apply tire patching rubber and finally skive the patch flush with the belt cover.

ADEQUATE REPAIR KIT includes sharp cobbler's knives and a stone to keep them sharp; supply of emery cloth, rubber cement, inner tube patching rubber, rip plates and standard belt fasteners and accessories, together with rags and gasoline for cleaning.

As each belt is installed, remnants should be kept, because they will prove useful in subsequent repairs.

Where gouges have penetrated the belt, or longitudinal rips have occurred, these points must be cleaned, sanded, cemented and reinforced with rip plates at threeinch intervals. Transverse rips require similar treatment with standard belt fasteners instead of rip plates. Use rip plates on longitudinal rips only, and standard fasteners on transverse rips only.

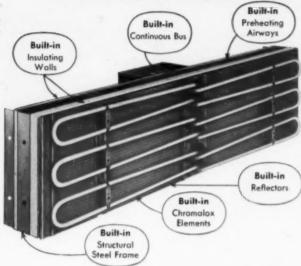
When holes in the belting do not permit the simple use of rip plates and fasteners, cut out the hole into the smallest possible rectangle with its sides parallel to and at right angles to the belt edges. Then, from belting remnants, cut an exact fit for the hole and insert the

(Continued on page 142)

Check page 142 for Vulcanized Patch Data



Announcing a new and better INFRARED Generator



CHROMALOX Electric RADIANT PANELS

Now, more efficient far-infrared comes in convenient pre-engineered panels, reducing oven building to a matter of determining heat requirements and assembling panels to fit the job.

CHROMALOX Electric Radiant Panels generate more uniformly absorbed farinfrared heat with quick heat-up and reduced oven lengths.

It's the far-infrared wave length that makes the difference.

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 per hour.
- ✓ Insulated for voltages to 575 V.
- Lowest installed cost per kilowatt
- ✓ Wark temperatures to 700° F, easily obtained.
- ✓ Accurate "dialed" control.
- Absolutely uniform radiation—na hat or cold spots.

BC

✓ Built to UL and NBFU requirements.

NOW. . . Oven Building as Simple as



It's easy to build ovens of any desired height and length with lightweight Chromalox Electric Radiant Panels. Panels come in 1 x 4 ft; and 2 x 4 ft; sizes, ready to erect and connect with easy-to-follow instructions in each corton. Chromalox on-the-spot engineering assistance to help determine your requirements is yours—no obligation, of course.

CHROMALOX Electric Heat

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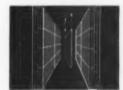
CHROMALOX FAR-INFRARED

For Baking, Drying, Curing, Dehydrating

and many other applications.

9 WAYS BETTER

- 1 Longer wave longth—obserbed equally fast by all colors.
- 2 Shatter-proof construction nothing to break and contaminate.
- 3 Non-diminishing output from allmetal Chromolox tubular heat generators.
- 4 Uniform heat no hot or cold spots.
- 5 High intensity radiation—with more watts per square foot.
- 6 Quick heat-up with energy transformed instantly into heat on the work.
- 7 Low-cost oven assembly.
- 8 Infinitely variable output—from 0 to 100% of capacity.
- 9 Additionally safe for any work invelving volatiles.



Easily erected banks of Chromalax Radiant Panels are ideal for line production. Far-infrared heat is radiated directly and uniformly without hot spots



Chromatox Radiant Panels can be erected into any aven shape. Rugged construction permits their use in assembly lines, even when hazards of splashed liquids, volatiles and maisture are present.



IC-6

C. B. Rozers and Aracciates, 1989 Peachtre St., N. E., Atlanta S. Ga.; L. R. Ward Co., 2711 Commerce St., Dallas I, Texas; 1814 Texas Aromes, Heuston 3, Texas; 1819 Houth Roston Are., Tukas 14, Okla.; W. R. Phillips, Rosto 3, Rabigh, N. C.



End of the up-slope haul is the top of the pile at Georgia Power's largest generating plant. Here, the tractorbulldozers spread their loads into well-compacted layers.

Coal Handling in Georgia Power Plants

HIGHLY mechanized handling of crushed coal has made fire prevention more effective and manpower more efficient for Georgia Power Company. At Plant Yates, near Newnan, Georgia, the 400,000 ton coal pile is 50 ft high, 1,000 ft long and 500 ft wide.

Conveyors feed the crusher, the pile, and the power plant. Three Cat D8 Tractors work the pile, spreading coal dumped by conveyor. A moderate amount of compaction by the bulldozer and carrier wagon equipped tractors serves to limit spontaneous combustion.

Plant Yates, which has been in operation about two years, has only had one fire in the coal pile during that time. The coal handling method yielding this result is also employed at two other modern Georgia Power Company generating stations.

One previous method was to dump coal from a crusher onto a pile, and then rehandle it with dragline and bucket. This method left the coal piled so loosely, particularly at the edges, that air got into the coal pile and supplied oxygen to start and maintain fires from spontaneous combustion. Whenever evidence of

combustion in the pile was discovered, the power company spread the coal with the drag scraper bucket.

Georgia Power Company started using Diesel tractor equipment to stack and reclaim coal as early as 1938. When the operator sees evidence of a small fire, he digs and spreads the hot spot out with the tip of his blade, and then covers it with fine coal and compacts it to smother the fire. From this early beginning the present system of coal handling developed and grew.

Courtesy, Caterpillar Tractor Co.

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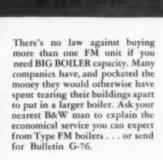


Set it down where you want it . . . Set it up in a hurry



THE BABCOCK & WILCOX COMPANY BOILER DIVISION

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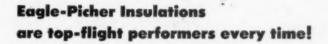


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Eagle-Picher Insulations offer more heat-conserving efficiency per dollar

Eagle-Picher Industrial Insulations are the natural choice of smart-thinking purchasing agents, plant engineers and other executives who are concerned with production efficiency and economy. They rely on Eagle-Picher Insulations to cut costs... to provide equipment with the highest possible thermal efficiency... to help guarantee precise temperature control.





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Eagle-Picher insulations are available where and when you need them.

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. . . *A typical team of hard-working materials



The answer to the problem of efficiently insulating flat or curved surfaces on larger types of heated equipment. Mineral wool is felted and secured with flexible metal

fabric. Outstanding physical and chemical stability for maximum resistance to water, steam, corrosive fumes and normal vibration,



Englo-Pichor Super "65" Insulating Comont — An all-purpose, rust-inhibitive, extra-adhesive insulating cement. Provides great coverage... retains thermal efficiency. Dry coverage, 50-55 sq. ft. 1 inch thick per 100 lbs. Efficient up to 1800 F. Re-

claimable where temperatures do not exceed 1200 F. Easily applied on all kinds of surfaces.



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Since 1843 · General offices: Cincinnati (1), Ohio

Insulation products of efficient mineral wool—for a full range of high and low temperatures. Technical data on request,



HELPING the MAN-IN-THE-PLANT

ideas . . . tools . . . methods . . . devices



Ring Gives Proper Screw Size Number

To remember numbered sizes of wood screws which fit drilled or countersunk holes of various dimensions is often a difficult job, especially when complicated by many screw sizes. To save time and guesswork, a simple, handy method of reference has been devised by John Radjenovich of Allis-Chalmers mill shop. It consists of merely a wire ring for holding numbered screws of all sizes used and is attached by a chain to the column of the drill press.

By making it easier for operators to check numbers against screw dimensions, the device helps prevent selection of the wrong tool size. In addition, it eliminates scrapping of jobs because of wrong hole size, and enables foremen and inspectors to more easily check the finished holes. This idea has been applied to all mill shop drill presses at Allis-Chalmers.

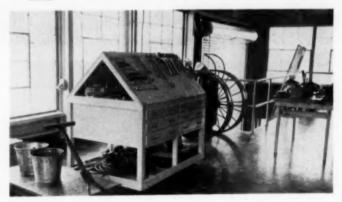
Combination Tool Rack and Parts Storage

To provide a portable rack which not only carries the hand tools required in a maintenance overhaul, but also to supply bolts, nuts, washers, gaskets and other small parts as well as to offer a handy place for sorting and storing them during dismantling, one gas pipeline company equips each compressor station with a sturdy wooden rack which displays the tools handily.

Each unit has a drawer and platform space for storage of small tools and parts.

The unit is mounted on casters, so that it may be readily rolled to which ever of the units is being serviced and so that it can be pulled along as work is done at first one and then another of the work areas on the engine.—Elton Sterrett, Houston, Texas.

Shelf space at the bottom, as well as that under the sloping tool display boards, is enclosed with a raised edging to insure retention of materials stored.



\$\$ for your ideas . . . methods . . . short-cuts
Send your ideas, methods, etc. to Southern Power & Industry

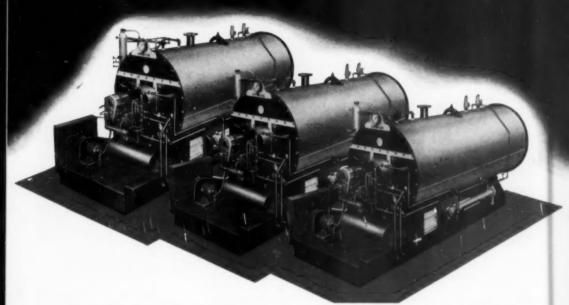
Payment is made for suitable material.

Articles from engineers and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

A photo or rough sketch will make your idea more valuable.

SP&I, 806 Peachtree St., N.E., Atlanta 5, Georgia

THE TOURS COUNTING Superior



Battery installations of Superior Steam Generators provide extreme flexibility to meet the most widely fluctuating steam demands. A hospital installation illustrates the point.

From early June through September, steam demand is limited to the needs of hot water and sterilization. Any one of the three units carries this load with ease . . . and at higher efficiency than could be obtained by minimum operation of a larger boiler.

When cold weather adds its heating load, a second Superior Steam Generator is fired. Only the most severe weather demands firing the third unit . . . which throughout the rest of the year provides stand-by equipment which is desirable in any operation.

By employing different combinations of the three, 7 in all) allowing each unit in turn to share the load; all enjoy longer life at maximum efficiency . . . and by using only the number dictated by the steam demand, maximum economy at every stage of steam demand is assured.

Let us show you how battery installation can serve you better in your new plant . . . or augment your present steam facilities.

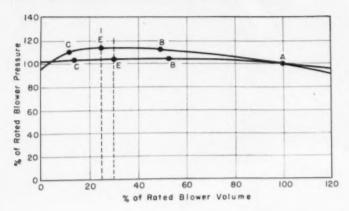
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for performance you can BANK on

SUPERIOR COMBUSTION INDUSTRIES INC. TIMES TOWER, TIMES SQUARE, NEW YORK 18, N.Y. TOPESTOS

STEAM GENERATORS

plant maintenance troubles and cures (continued)



Pulsation in Centrifugal Blowers

When a centrifugal blower is used in the capacity range for which it was designed, pulsation is seldom a problem. There are, however, certain applications of blowers, where it is necessary to keep the blower running during periods of very small demand. In the case of certain heating processes these "turn-down" or "weekend holding" periods may call for as little as 10 or 20 per cent of rated volume output of the blower. Surging can set up a pulsation which may disturb the process and cause overheating and consequent damage.

Pulsations, as noted in the introductory remarks, can be prevented and corrected. With the use of these pressure-vs-delivery curves, O. W. Acheson, Billmyre Blower Division, Lamson Corporation, Syracuse, N. Y., explains the mechanics of pulsation and the characteristics of a centrifued blower.

THE illustrated pressure-vs-delivery curves are typical of all centrifugal blowers, the upper curve being of a well-designed blower, and the lower curve of a "not-so-well" designed blower. Note that in both cases the pressure attains a maximum high point at some relatively low rate of air output, the curve rising at air delivery rates below this critical value and descending at rates above this criti-

If the demand on a blower is decreased in volume from a normal operating point, A, to another normal operating point, B, above the maximum-pressure point, the pressure at the blower merely rises correspondingly, and pulsation does not occur. If, however, the load or volume requirement is decreased beyond the maximum-pressure point, E, to a very low point, such as C, the following sequence of circumstances may set up surging.

The blower delivery pressure

first decreases from E to C at the blower itself. Thus, for a moment, the pressure in the piping system connected to the blower is greater than the pressure at the blower itself. Thus the air in the line tends to reverse its direction and flow back into the blower (this can be extremely dangerous in handling gas to a burner or combustion chamber) until both pressures become equalized. When this is achieved the blower again resumes its normal function of pumping air into the system-until the restriction at the line outlet again reduces throughout and causes the sequence to repeat. It is this repetition which constitutes surging.

The frequency and intensity of surging depends upon: (1) the slope of the pressure-vs-volume curve, (2) the rate at which air is being removed from the system, and (3) the volume of the pipe system to which the blower is delivering air. The same principles apply

whether the centrifugal unit is operating as a blower or an exhauster.

Prevention

The wisest action to take in the prevention of pulsation is the anticipation of circumstances which might cause it. The phenomenon will not occur in volumes above the point E. If the application is such that low turn-downs are expected, it is prudent to so indicate when the blower is being ordered. The blower manufacturer, can in most cases, select and specify to prevent pulsation.

If, however, pulsation or surging is noticed in a finished installation, any of the following four steps can be taken:

- Consider the economics of replacing the blower with a smaller capacity unit having a consequently lower surge point.
- Consider purchasing a small capacity unit for turn-down periods.
- (3) Make sure that the amount of air delivered by the blower is always above the surge point by bleeding enough air out of the system beyond the blower. If you are handling gas rather than air it will be necessary to recirculate this bleed flow back into the blower inlet. If you recirculate the bleed, however, remember that you are compressing and re-compressing that portion of the gas and building up the blower temperature to a point which may be detrimental.
- (4) If the surging is infrequent and of short duration, it may not be harmful to the blower at all. Surging at the point of air or gas use may be eliminated by adding a surge tank or increasing the cubical content of the piping in front of the nozzle.
- (5) Ask the manufacturer to make minor changes in the blower design to permit bypassing of the air, or take other steps which will elimi-



That's All the Cleaning an Allis-Chalmers TEFC Motor Ever Needs

MAINTENANCE COSTS ARE LOW for users of Allis-Chalmers Totally-Enclosed, Fan-Cooled Motors. They are easy to clean because even the stickiest dirt can be wiped or blown off without dismantling the motor or even stopping it. They seldom require cleaning because cooling air flows over the outside of the motor. There are no external concealed air passages to clog up and cause over-heating. You get better operational continuity, lower maintenance.

Bearings Save Maintenance, Too

Double-shielded ball bearings require no regular maintenance under most normal operating conditions. Yet if difficult service makes re-lubrication desirable, it can be done without dismantling the motor or bearings. Rigid cast iron frame and stiff end brackets maintain bearing alignment . . . assure maximum bearing life.

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CONTROL — Menuel, magnetic and combination starters, push button stations and components for complete control systems.

TEXROPE — Bolts in all sizes and sections, standard and Vari-Pitch sheaves, speed changes.



PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge

plant maintenance troubles and cures (continued)

nate the troublesome pulsation at the sacrifice of a little blower efficiency or tightness of the installation.

Actually, the more efficient a blower operates and the tighter the air system is beyond the blower. the more likely it is to surge at very low operating points. Fortunately, the uses for compressed air or gas, which demand blower operation at critically low output, are infrequent so that the use of highefficiency equipment can be used in all but the rarest of cases.

Bearing Surfaces

A BAR magnet of the powerful alloy type, provided with a brass handle, can be used to handle smaller sizes of anti-friction bearings when examining or installing. This prevents moisture from the fingers causing corrosion of the polished metal bearing surfaces.—

Thomas Trail, Maryland.

Maintenance Savings With The Impact Tool

WHILE the impact tool is by no means new, many industrial plant maintenance crews are still using the older, slower, hand methods. Here are three actual examples of savings that can be made through use of this modern maintenance aid.

Refinery:

In a refinery, removing and applying nutrion a heat exchanger had required 1½ hours for two men. The same job of removing and putting on 44 bolts %" in diameter was done in 20 minutes with the Ingersoll-Rand air-powered Impactool. A reduction in time from 3

man hours to 2/3 man hour, or 78% of the time was effected, and the equipment paid for itself in 32.7 working hours.

Steam Turbine:

When a generator goes out of commission, downtime charges sometimes run as high as \$2,000 per hour. Add the wages of four or five mechanics for from several days to several weeks, on overhaul work, and the repair cost can be staggering. So when a power generating company finds a way to save at least 50% of the time on certain turbine overhaul operations, the savings are significant. That is

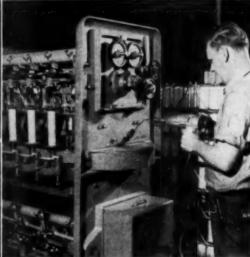
what happened at an electric utility company's generating plant when an electric driven and an air driven Impactool were used for nut-removal and nut-running on turbine overhaul jobs.

Textile Mill:

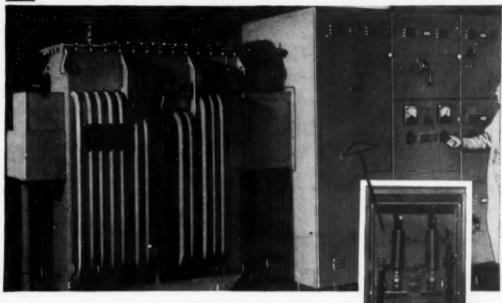
A textile mill processing synthetic varns reports that the use of an electric Impactool for preventive maintenance helps keep their mill machinery in continuous operation. The plant has developed an effective preventive maintenance program, whereby the electric Impactool cuts downtime from 1/3 to 1/2. Since 8 or 10 machines are usually overhauled each month, saving of maintenance time is substantial. It has proved so valuable as a time-saver that the plant uses six or seven of these tools in repairing their twisters and high speed spoolers.

Typical plant maintenance operations are illustrated in these Ingersoll-Rand Company photographs.





Now, St. Paul Foundry & Mfg. Co. buys all its power; saves \$25,000 annually!



Costly, Inefficient Steam Generating Plant
Replaced by



D-C UNIT SUBSTATION

Boiler capacity for cold weather heating is all that the St. Paul (Minn) Foundry and Mfg. Co. retains of its former steam-driven d-c generating plant. By using purchased power, the company saves \$25,000 annually in fuel, operating, and maintenance costs.

Purchased power is a-c, but the plant requires d-c power for yard cranes and hoists. To tie these two systems together, a six-tube G-E sealed ignitron rectifier was installed. It operates 24 hours a day, 7 days a week.

General Electric d-c unit substations with modern sealed ignitron rectifiers occupy minimum space. The transformer, rectifier and low-voltage switchgear are supplied as a complete, metal-enclosed, packaged unit. Absence of exposed, energized parts provides maximum protection to personnel. For information on d-c unit substations to fit your d-c power needs, call or write your nearest G-E sales office. General Electric Company, Schenectady 5, N. Y.

This photo shows the simple, compact design of the G-E ignitron mercury-arc rectifier unit.

No major moving parts to wear out.

No bearings or prushes to check.

No vacuum pump required.

GENERAL E ELECTRIC

Questions and Answers for Men in the Plant HOW, WHY, WHEN, and WHERE

TURBINES

By A. T. LOHKAMP

Superintendent of Power Plant Pasco Packing Co. Dade City, Florida

Q-What is a heat engine?

A—Any apparatus which can convert (change) heat energy into mechanical power.

Q-What is a prime mover?

A-Any engine which converts energy into mechanical energy.

Q-What is torque?

A—Torque is turning power. Torque or turning power must be developed to start a turbine rolling. Power is the product of torque and speed. Once rolling or turning over, torque is required to maintain speed and power output.

Q-Does a turbine have a high starting torque?

A—Yes. The starting torque is about twice the full load torque.

Q—Does the output of a turbine vary directly with speed?

A—No. Output of a turbine varies with the weight of steam flowing through the turbine. Speed can be varied over a wide range with little effect on the amount of power developed.

Q-Does a given horsepower rating indicate the size of a turbine?

A—No. Turbine dimensions depend on steam conditions and rated speed, as well as hp capacity. Turbine taking steam at 850 lb pressure may be less than half the size of one using 175 lb steam, if other conditions are the same in each case.

Q—Does the efficiency of a turbine depend entirely on the steam rate?

A-No. A turbine using 50 lb of steam may be two or three times

as efficient as turbine having a steam rate of 16 lb, depending on initial and final steam conditions.

Q—Would a turbine having 100 per cent efficiency convert all of the heat of the steam into power?

A-No. Roughly two-thirds of heat energy put into the steam by the boiler is discarded in condenser.

Q—Are turbines used for constant speed application only?

A-No. They are often applied where wide ranges of speed are required.

Q-Why is dry steam necessary for turbine operation?

A—Wet steam increases wear and decreases economy of operation. Each 1 per cent of moisture in steam, in addition to increased wear, increases steam rate about 2 per cent. A turbine having a steam rate of 15 lb/hp with dry saturated steam would have a rate of 15.6 lb if steam contained 2 per cent moisture.

Q—Is there any loss in taking steam from 175 psig through a reducing valve to 45 psig for process work?

A—If lines are well insulated there is little actual loss as excess heat in 175 psig steam turns up as superheat in the 45 psig line with minor losses. If steam requirement is large enough on the 45 psig line to make a turbine practical, power can be generated by replacing the reducing valve with a turbine. By replacing a reducing valve with a turbine, power can be generated at the lowest possible cost.

Q-Is fairly high pressure neces-

sary for generating power with a turbine?

A—Not necessarily. There is more energy available for power when steam at atmospheric pressure is expanded through a turbine to a high vacuum than if steam at 200 psig is expanded to atmospheric pressure.

Q—When is maximum torque developed by steam striking turbine blades?

A—When the turbine rotor is at a standstill or stationary as at starting up. There is no work developed under these conditions, because the rotor is not moving. Power is the product of torque and speed. The above condition is one of maximum torque, zero power, zero speed.

Q—What is the relation between the velocity of the moving surface (blading) in an impulse turbine and velocity of the steam in order to fully utilize the kinetic energy of the steam? In a Reaction Turbine?

A—To fully utilize the kinetic energy of a jet of steam, the blades of an impulse turbine should have a velocity of about one-half the velocity of the jet of steam. In a reaction turbine the blade speed should approximately equal the jet velocity.

Q-What is kinetic energy? Potential energy?

A—Kinetic is active energy; potential is stored energy. A 100 lb weight at top of a 40 ft pole possesses potential energy. If it drops or rolls off the pole, it then possesses kinetic energy.

Q—What is the difference between an impulse and reaction turbine?

A—Steam in an impulse turbine expands in the stationary nozzles or diaphragms. The blading surfaces are parallel to each other. Steam in a reaction turbine expands about equally in the stationary and moving blades. In an impulse turbine there is practically no pressure drop through the moving blades, while in a reaction turbine there is pressure drop through the moving blades.

Q—Why are the wheels in the various stages of an impulse turbine of unequal size?

A—Wheels get larger as the pressure of the steam decreases through the turbine so that the blade velocity can be maintained in proper ratio to steam velocity.

Q—Why are the blades of a reaction turbine usually mounted on a straight cylindrical hub?

A—Half the expansion takes place in the stationary blades and half in the moving blades with the velocity at the outlet edges of the blades greater than the velocity of the steam approaching the blades.

Q—What happens to steam as it flows through an opening from a high pressure to a lower pressure —or through a turbine?

A—In passing from a higher pressure zone to a lower, steam must either lose heat (through doing work) or the superheat will increase or tend to increase. If steam is passing through a pressure reducing valve, it will become superheated. When steam expands in a turbine nozzle, instead of becoming superheated, it will lose heat and become wetter as it passes through the stages of the turbine, because work is being done. In a turbine, steam liberates heat as its pressure is reduced.

Q-What is Entropy of steam?

A—That property of steam that does not change during an adiabatic expansion. The change in entropy has been defined as the quantity of heat added, divided by the absolute temperature at which the addition of heat takes place.

The units of entropy are Btu per degree fahrenheit per pound.

Q-What is Adiabatic Expansion?

A—The expansion of steam with no heat being added or taken from the steam. In adiabatic expansion there is no change in entropy.

Q-What are the fundamental parts of a turbine?

A—Basically, all that is needed to make a workable turbine is an orifice or nozzle through which steam issues and buckets mounted on the rim of a wheel. Fundamentally, only two parts are needed—nozzle and rotor.

Q-Name other principal components of a turbine.

A-Bearings to support rotor; thrust bearing (very important while speeding up and slowing down and for varying load); oil pump to supply oil to bearings; governor (steam turbine governors must be stable in operation, have no dead band, and maintain speed within 1/2 of 1 per cent. For turbines which operate at base load, it may be desirable to have a governor which has speed regulation from zero to full load in the order of 4 to 5 per cent); steam seal glands and packing to prevent steam leakage along shaft: overspeed governor and tripping device; throttle valve combined with trip valve; and steam strainer.

Q—Name some of the accessories of a turbine installation necessary to make it efficient in operation.

A-In addition to above, multiple governing valves; oil reservoir large enough to hold ample operating supply; oil cooler (twin coolers either of which would be ample for cooling required); steam-driven auxiliary oil pump to cut in automatically if regular oil pump fails; oil pressure trip mechanism or device to automatically trip turbine out if oil pressure fails; steel oil piping of welded construction; vibrating reed or electric indicating tachometer; operating gauges and panel board; gland seal steam condenser or vacuum pump to condense or get rid of steam which may leak past shaft seals; and steam seal regulator to maintain constant gland sealing steam.

On a non-condensing turbine, there must be a non-return valve in the exhaust or discharge piping and a relief valve between the exhaust connection of the turbine casing and the first stop valve in the exhaust line.

Q-On automatic extraction turbines, what is required in addition to the above mentioned items?

A-There must be an extraction pressure gauge; Automatic control device for controlling the pressure of the extracted steam by controlling the amount of flow to the lower pressure stages of the turbine: interconnection between the speed governor and extraction device to maintain smooth continuous operation; and an automatic non-return valve in extraction line with trip operated by over-speed governor to positively close the non-return valve if the turbine over-speeds and trips out.

Q—Are foundation prints always included when purchasing a turhine?

A-Not always. Some companies include these prints with the price of the unit, while others make a special item of them.

Q—Are the over-all size and weight necessary to the purchaser?

A—Yes. These items are of great importance when figuring the weight-bearing properties of the soil and determining whether piling is necessary under the foundation.

Q-What are some of the important auxiliaries to be considered for large turbines, which may operate condensing or combination of extraction and condensing?

A—Condenser of sufficient size to condense all steam which flows to the condenser; circulating water pumps where needed to circulate condenser cooling water; condensate pump, preferably two in number so arranged that spare will cut in if operating pump fails—most condenser hot wells are so arranged that they will operate only one minute, if condensate pump stops;

air ejector to evacuate condenser of air and maintain a high vacuum while operating; and air meter to indicate amount of air being handled by air injector. Any increase in amount of air handled would indicate increased infiltration and indicate need for checking installation for leaks.

Q—What is meant by dead-band when speaking of a governor for a turbine?

A—Dead Band is the total amount of speed change with no resulting governor action. A deadband of 1% on a 3600 rpm turbine would mean that the speed could vary by 36 rpm before the governor would take hold and correct the speed.

Q-What is an isochronous governor?

A-Governor is said to be isochronous when the speed of rotation is the same for all positions within its limits of movement. That is, it has zero speed regulation from no load to full load. This is opposed to the governor having a speed regulation in the order of 4 to 5% from no load to full load. A governor having a speed regulation of 4 to 5% is suited for base loading as when two turbines are to be operated in parallel. One machine may have a broad governing range and will not be sensitive to load changes while the other machine may have a narrow governor range and be very sensitive to load changes. Then a set load can be set on the machine having the broad range governor (base loaded) and the load changes may be taken on the narrow range governor. An Isochronous governor has a zero range of speed control.

Q-What is Labyrinth packing?

A—Consists of a series of steps in a metal ring inserted in the casing of a turbine with matching steps cut on the shaft. These serrations or steps may all be the same height or they may have uneven or staggered heights. Labyrinth packing should be spring backed so that any slight rubbing of the shaft will not tear up the packing or shaft.

Q—What velocity is theoretically acquired by steam in flowing through an opening from a region of high pressure to a region of lower pressure?

A-Kinetic energy acquired can be computed from the following formula:

$$V = 223.7 \sqrt{H_1 - H_2}$$
 (feet per second)

Where V = velocity acquired by steam in ft/sec

H₁ = total heat of steam at higher pressure in Btu/lb

H₂ = total heat of steam at lower pressure after adiabatic expansion

Example: Steam flowing from 175 psig to 21/2 in. hg abs.

Solution: Steam at 190 psia = 1198 Btu

Steam at 21/2 in. hg abs = 1120 Btu

 $H_1 - H_2 = 1198 - 1120 = 78 Btu$

Then substituting in the formula:

$$V = 223.7 \sqrt{H_1 - H_2}$$

$$V = 223.7 \sqrt{78} \text{ (ft sec.)}$$

$$\sqrt{78} = 8.832$$

$$V = 223.7 \times 8.832 = 1975.7184$$
 ft/sec

Another formula frequently used to find steam velocity assumes expansion at constant entropy. However, the answers obtained by the two methods are so close there is little to argue about and use of the constant demonstrated above makes calculations easier.

Q-Why is staging necessary in steam turbine design?

A—One reason is the speed of the rotating elements. Note on the opposite page the box tabulation on steam flow calculations. Let's assume that the speed of 1975.7184 fps is the speed of steam through one stage of an impulse turbine. In other words, a one stage turbine designed to take 175 psig steam and exhaust at $2\frac{1}{2}$ in hg abs. The blade velocity should be $\frac{1}{2}$ the steam velocity or: 1975.72 \div 2 = 987.86 fps.

Assuming the mean diameter of the blading on the wheel is 3 ft, the circumference of the wheel would be $3\times3.1416=9.4248$ ft. If the blading travels ½ the speed of the steam, then the wheel would have to turn

$$\frac{987.86}{9.42}$$
 or 104.87 times per sec or 104.87 \times 60 = 6299.2 rpm

This speed would be way too high for most applications, but some turbines run 10,000 rpm. The majority, however, operate at 3600 rpm or less. The above is not actual design data, but gives some idea of why staging is used and speeds attained by turbine wheels.

The turbine discussed above would be extremely inefficient. The need for high efficiencies and especially the present demand for the very highest efficiencies makes staging necessary. By varying speed, diameter of wheel, etc., the proper relation between steam and bucket velocity can be maintained. But the proper number and size of stages must be used for a given rating and energy range to meet efficiency requirements. The rotation loss varies as the cube of the bucket velocity and the square of the wheel diameter. Too many stages can result in poorer efficiency as well as having too few stages.

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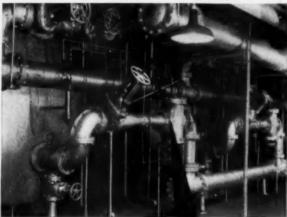
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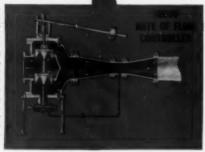
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Q—What are the types of extraction control valves used on an automatic-extraction turbine?

A—The grid valve, the poppet type valve, or balanced piston type valve. These may be single or multiported. The grid valve is a diaphragm type, multiported with external operating mechanism.

Q-What is a speed corrector?

A—Device added to a governor to make it essentially isochronous in operation. The addition of a speed corrector should give a settled speed regulation of less than 0.1%.

Q—How does an extraction type turbine maintain the pressure on the extracted steam line?

A-By controlling the amount of steam flowing to the following stage after the extraction opening.

Q—Why is a positive, fast-acting governor necessary on a steam turbine?

A-There is little fly wheel effect and if the load on a turbine were suddenly dropped the speed would increase until it would double in less than six seconds. A good stable governor must act to maintain nearly constant speed with extreme changes in load. If the turbine is driving a generator, there may be considerable flywheel effect due to the mass of the generator rotor. Constant speed is very hard to maintain on a turbine. In many plants where several turbo-generators are operated in parallel there may only be one with a speed corrector to take load swings and the others may be base

Q—How does the smoothness of a straight-eight or V-eight engine in operation compare to a steam turbine?

A—An automobile engine would have to have more than 100,000 cylinders to be equal in smoothness to a modern steam turbine having more than a hundred buckets on each of several wheels. The low vibration of a steam turbine is basically due to the fact that the power comes from a con-

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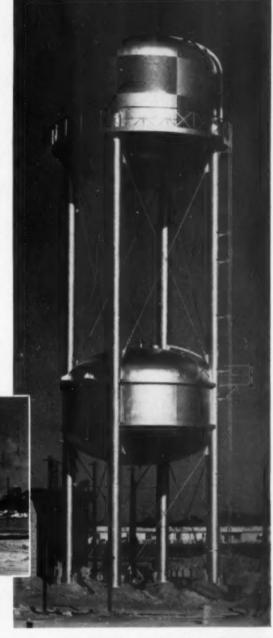


HORTON steel storage tanks are daily playing an important part in the operation of the Hialeah, Florida, shops of the Seaboard Airline Railroad.

The highly functional structure at the right serves three purposes. It provides water (1) for use in the shop area, (2) for cooling radiators, and (3) for use in diesel locomotives. The characteristics of water required for these different uses necessitated the building of a structure with three separate storage units. The upper tank, which has a capacity of 50,000 gals., supplies water for domestic use. The lower tank has a gross capacity of 35,000 gals, and supplies cooling water for radiators. In addition, it has a 3,000gal, compartment on the inside to store water for diesel engines. There are, of course, three separate sets of pipingone for each type of water.

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tinually flowing and expanding stream of steam instead of a series of pulsating expansions as in a reciprocating engine.

Q—Is a flywheel necessary on a steam turbine?

A—No, because the flow of power is so smooth that no flywheel is needed to smooth out pulsations as we have in an automobile engine.

Q-Where is labyrinth packing used?

A—In the glands to seal the casing against steam leaking into the room along the shaft and to prevent air leaking into the turbine. It is also used as inter-stage packing to keep steam from short cycling from one stage to another along the shaft.

Q—Is Labyrinth packing always used in all sizes and kinds of turbines?

A—No, carbon packing is often used on smaller sized machines and in older machines. Regular flexible metallic packing may be used on small sizes.

Q-What are five main types of thrust bearings?

TYPE 2

TYPE 2A

A—The collar, roller, ball, Kingsbury, and tapered land (modification of the Kingsbury).

Q—In what turbines are we most likely to find each type of thrust bearing?

A—The collar, roller, or ball type of thrust bearings are principally found in the older machines and in mechanical drive turbines. The Kingsbury or modified Kingsbury thrust bearing has superseded all others in the larger size modern turbines. Over half of the large turbines have the tapered land type of thrust, which is a modification of the Kingsbury and has proven very successful.

Q—What would happen if the thrust bearing failed on a steam turbine?

A—If the thrust bearing were to fail or wear excessively while the machine is in operation, it would allow the blading to come in contact with the nozzles and probably strip all the blading from



Light Plant Solves Problems of Sticky-Rings and Carbon-Build Up

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the machine. It may wreck the entire turbine. There have been cases of thrust bearing failure in impulse turbines with little resultant damage to blading because the clearances are relatively large. However, the danger of complete wreckage is a constant threat and the thrust bearing should be renewed at the first indication of excessive wear or damage.

Q-Why is an overspeed governor necessary on a steam turbine?

A—Because the speed governor may fail, allowing the turbine to overspeed to the extent that it would burst. If the speed governor were to fail, the only thing limiting the speed of the machine (in event of load failure) would be the velocity of the steam through the nozzles or jets.

Q—What should be the maximum temperature of the oil leaving a turbine main bearing?

A-It should not exceed 150 F.

Q-Name the three fundamental types of steam turbines,

A-The Impulse, Reaction, and the Impulse-and-reaction.

Q-What is the Curtis turbine?

A-An impulse turbine employing velocity-and-pressure stages.

Q-What is the Rateau type turbine?

A—The Rateau turbine employs pressure staging.

Q-What is the Parsons Turbine?

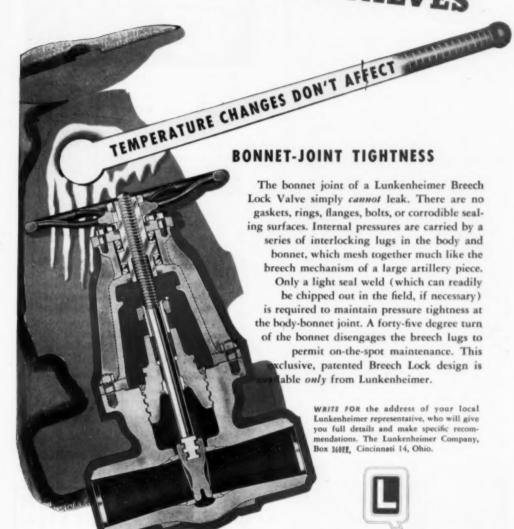
A—The reaction type turbine is sometimes called the Parsons turbine

Q—Why are there three types of impulse turbines designated as DeLaval, Curtis, and Rateau types?

A—These turbines were named after the men who first obtained the original patents. A single stage axial flow turbine is usually considered the DeLaval type. Those turbines belonging to the velocity or velocity-and-pressure staged types are usually called the Curtis type. The Rateau turbine is built up of a series of DeLaval stages.

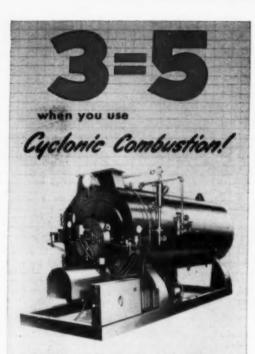
Q-What is an axial flow turbine?

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A—One in which the steam flows approximately parallel to the turbine shaft.

Q-What is a Tangential flow turbine?

A—The tangential flow turbine, also called the bucket-wheel turbine, is one in which the steam flow is approximately tangent to the rim of the wheel.

Q-What is a radial flow turbine?

A—The steam flows either radially inward to or outward from the shaft. The blading, instead of being on the rim of the wheel, is on the side of the wheel.

Q-What is meant by a self-aligning bearing?

A—Bearing having a ball or spherical seat in which the bearing is free to move so that it will not bind the shaft if minor misalignment occurs.

Q-What is the dummy piston in a turbine?

A-A piston is used on highpressure reaction turbine rotors for balancing thrust. Such a piston is called a balance piston, dummy piston or dummy-balance piston. In operation of the turbine, steam flowing through the blades sets up an unbalanced axial thrust of considerable force. The balance piston is part of the reaction turbine rotor. Balance pistons or dummy pistons are rotating sections with steam of proper pressure to balance the thrust piped to either side of the piston. Steam may be piped from some of the later stages of the turbine or from the condenser.

Q-What is a squealer ring?

A—A ring on the shaft of a turbine, which is set with a certain specified amount of clearance when the turbine is erected. If the thrust bearing should wear by the amount of this clearance or for any reason the shaft moves axially the amount of this clearance, the ring rubs a stationary surface and sets up a very loud squeal which is the sign of trouble and need for inspecting the thrust bearing.

Q-What are the characteristics of an impulse turbine?

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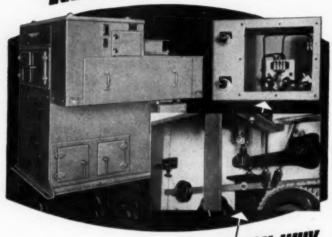
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A—The important characteristics are few stages, steam expansion occurring only in the stationary nozzles, large drop in pressure per stage and best efficiency when blade velocity is approximately ½ the initial velocity of the steam.

Q-What are the characteristics of the reaction-type turbines?

A—Many stages, expansion of the steam in both the stationary and the moving blades, small pressure drop in each stage, and best efficiency obtained when the blade velocity is nearly equal to the highest steam velocity.

Q—How many types of stages are used in turbines?

A—There are three types of stages used in turbines: (1) The velocity impulse stage, (2) the pressure impulse stage, (3) the reaction stage.

Q—What is a Velocity Impulse Stage?

A—Stage consists of that part of a turbine steam path wherein work is done by the impulsive force of the steam. A Velocity stage includes two rows of nozzles or guide vanes and two sets of moving blades.

Q-What is a pressure stage?

A—That portion in the steam path of a turbine wherein work is done by the impulsive force of the steam. The path comprises one or more impulse stages. A pressure stage always begins with a set of nozzles, but may contain, in addition, many rows of impulse stationary guide vanes and corresponding rows of moving blades.

Q-What is a reaction stage?

A—That portion of the turbine in which work is done by the reactive force of the steam. It contains one set or row of stationary nozzles and one row of moving blades upon which these nozzles direct the steam.

Q-What is reactive force? Impulsive force?

A—These two questions are combined because the description and comparison of the two tie together. A water hose clamped to a trolley and the discharge end of

the hose aimed at a solid sheet of steel placed a foot or so ahead of the nozzle on another trolley will demonstrate both impulsive force and reactive force. Turn the water on the hose which connects to valve. The force of the water striking the sheet of steel will move that trolley-this is impulsive force. Now, block the trolley holding the steel. The trolley holding the hose will begin to move back away from the sheet of steel-this is reactive force. A rotating lawn sprinkler turns because of the reactive force of the water issuing from the nozzle. A wind mill turns because of the impulsive force of the wind.

Q—Why are oil rings used on main bearings of turbines when they are pressure lubricated?

A—Oil rings are used to insure lubrication during starting up and shutting down the turbine and to insure lubrication in case of pump failure. Some modern pressure lubricating bearings are not equipped with oil rings. However, in most older machines oil rings are used in addition to pressure lubrication.

Q—Why do most governors operate on the hydraulic principle on large turbines?

A—Because it is much easier to make a governor that will operate a pilot valve which in turn admits oil above or below the piston of a servo motor than it is to make a governor which would operate the valve mechanism directly. To accomplish the latter, the governor fly-balls would have to be so large in order to operate the valves directly that they could not be accurately made. A direct acting governor would be unwieldy and awkward.

Q-What is a servo-motor?

A—A device for transmitting power from one media to another. Usually, a servo-motor consists of a piston and cylinder arrangement with the piston exerting force on valves or other mechanism through linkage. The governor operates a pilot valve which directs oil to either side of the piston, moving it to either open or



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DEMING Industrial PUMPS close a valve or operate other mechanism.

Q-What is a mechanical drive turbine?

A—A turbine used to drive machinery by direct connection to machines other than generators.

Q-How is turbine speed controlled by the governor?

A—By having the governor operate valves in sequence so that only the amount of steam needed by the turbine is admitted to the steam chest.

Q—How does a hydraulic governor operate?

A-Consists of fly-balls which, when rotating, are forced out against spring tension by centrifugal force. In being forced out the weights through a rotating slip connection exert pressure on a lever or link which positions the pilot valve. The position of the pilot valve determines whether oil is admitted to the open or close side of the piston in the servomotor. The servo-motor in turn operates the admission valves (which may be barlift or cam operated) so that the proper amount of steam is admitted to operate the turbine and maintain proper speed for load conditions.

Q-What do we mean by bar-lift valves?

A—Valves with varying length stems extending through a bar so that, as the bar lifts, the valves open in sequence and not all at one time. The governor regulates the lift of the bar.

Q-What are cam operated valves?

A—On a bar lift valve, there are only two rods extending through the turbine casing and need only two packing or stuffing boxes. The cam lift valves have the stems of each valve extending through the casing and making contact with a cam on a solid shaft. There is usually a spring on each valve to lift it from the seat in the turbine, but the position of the cam regulates the amount of lift and the governor regulates the cam position.

NEWS for the South and Southwest



Grinnell Company's new factory warehouse, fire protection fabricating shop and sales offices at 161 Glass Street, Dallas 2, Texas.

Grinnell Company-Dallas, Tex.

The Grinnell Company has opened a new factory warehouse and sales office at 161 Glass Street, Dallas 2. Texas, to provide improved service to its distributors in northern Texas and fire protection customers in Texas and Oklahoma, Building, of modern design, has 21,450 sq ft of floor space. It houses a fabricating shop and contracting office for Grinnell Automatic Sprinkler Fire Protection Systems. Warehouse will stock only the following Grinnell manufactured products: pipe fittings, nipples, pipe hangers, diaphragm valves and Thermolier unit heaters.

T. E. COLLINS is Manager of the Fire Protection Dept., and J E. HATT, Manager, Supply Sales Dept.

Mr. Collins has been with Grinnell for 47 years, starting in the Engineering Department at Charlotte, N. C., in 1905. In 1915 he came to Dallas as a contracting engineer. After a period of four years, 1920-1924, at Atlanta, Georgia, as Department Manager of Fire Protection, he returned to Dallas as Department

Mr. Hatt joined Grinnell in 1943 as salesman. In 1946 he became a jobber salesman at the Cleveland



T. E. Collins, Manager, Fire Protection Dept.



J. E. Hatt, Manager, Supply Sales Dept.

branch and in 1951 was appointed Manager of Supply Sales at Dallas.

FUTURE EVENTS Of Engineering Interest

AMERICAN SOCIETY OF REFRIGERAT-ING ENGINEERS, M. C. Turpin, See'y, 40 W. 40th St., New York 18, N. Y. June 1-4, 39th Spring Meeting, Atlanta Bilimore Hotel, Atlanta, Georgia.

AGRICULTURAL & MECHANICAL COL-LEGE OF TEXAS, Prof. P. G. Murdoch, Chemical Engineering Dept. Texas A & M College, College Station, Texas June 2-4, Symposium on "Instrumentation for the Process Industrice," Memorial Student Center, College Campus

OAK RIDGE INSTITUTE OF NUCLEAR STIDIES, Dr. Ralph T. Overman, Spe-cial Training Division, Oak Ridge, Tenn. June 9-July 4; July 7-Aug. 1; Aug. 11-Sept. 3, Courses in techniques of using radioisotopes.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, A. V. Hurchinson, Exec. Sec'y, 62 Worth St.,

Hutchinson, Exec. Sec'y, 62 Worth SL, New York 13, N. Y. Same 16-18, Semi-Annual Meeting, The Essex and Sussex, Spring Lake, N. J.

GEORGIA INSTITUTE OF TECHNOLOGY, C. H. Taylor, Coordinator Short Courses and Conferences, 225 North Avenue, N.W. Atlanta, Georgia N.W., Atlanta, Georgia June 16-27, Two Week Lubrication Course

STOKER MANUFACTURERS ASSOCIA-TION, Marc G. Bluth, Exec. Sec'y, 307 N. Michigan Ave., Chicago I. Ill. June 22-24, Annual Meeting, South Shore Inn on Lake Wawasee, Syrscuse, In-

AMERICAN SOCIETY OF MECHANICAL ENGINERIS, 011 & Gas Power Division, Wilbur W. Young, Chun, Publicity Com-mittee, 29 West 39th 84, New York 18,

June 23-27, 24th Annual Conference and Exhibit, Statler Hotel, Buffalo, N. Y.

PAN-AMERICAN UNION OF ENGINEER-ING SOCIETIES, Engineers Joint Coun-cil, 29 West 39th St., New York 18, Aug. 23-30, Third UPADI Congress, Tulane

niversity, New Orleans, La. NATIONAL ASSOCIATION OF PURCHAS-

FIONAL ASSOCIATION OF PURCHAS-ING AGENTS, George A. Renard. Exce. Secty, 11 Park Place, New York 7, N. Y. et. 19-21, Th District, 9th Annual Con-ference of Purchasing Agents of the Southeast, J. R. Carmichael, Conference Program Chmu., Atlanta, Georgia

AMERICAN GAS ASSOCIATION, H. Carl Wolff, Mgng. Dir., 420 Lexington Ave., New York 17, N. Y. etc. 27-New. I. Annual Convention, Auditorium, Atlantic City, N. J.

Reynolds Metals Appoints Three New Distributors

REYNOLDS METALS COMPANY, 2500 South 3rd St., LOUISVILLE, KENTUCKY, recently announced the appointment of three new distributors to handle their general line of aluminum mill products.

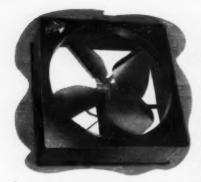
Appointments include: VINSON SUPPLY Co., 3331 Haggar Drive, DAL- LAS, TEXAS, to cover Dallas and Odessa, Texas, and Tulsa, Oklahoma; VERY'S BROS., INC., 65 E. Goodale St., Columbus, Ohio, to cover part of Ohio and western West Virginia and Eastern Kentucky; and G. A. AVRIL SMELTING CORP., Este Ave. & B&O Railroad, Cincinnati, to cover all of Kentucky, parts of Ohio and Indiana, western West Virginia and northern TENNESSEE.

ALCOA—Point Comfort, Texas

The POINT COMFORT WORKS of ALUMINUM COMPANY OF AMERICA has set the first of two new smelting lines into operation at the plant.

The new line increases Point Comfort's production capacity to about 135,000,000 pounds of aluminum annually. The U. S. Government will get first call for five years on the output of the two new Point Comfort units. The second new line is scheduled for completion within three months.





EMERSON-ELECTRIC

For big volume air-moving jobs, specify powerful, low-speed Emerson-Electric Belt-Drive Exhaust Fans. In 24", 30", 36", 42" and 48" blade sizes, capable of discharging up to 19,400 cubic feet of air per minute. Made for vertical or horizontal discharge.



...for employe efficiency"

All year long—but especially now during the hot summer months—stale, stagnant air can "eat up" payroll dollars by lowering employe morale and efficiency.

Emerson-Electric Exhaust Fans are the logical choice for your ventilation requirements. Built by a company with over 60 years of precision manufacturing experience, all Emerson-Electric fans are designed and constructed to minimize installation, operation and maintenance costs.

Strike "dead" air from the payroll! See your electrical contractor or write for free Exhaust and Ventilating Bulletin No. T87.

THE EMERSON ELECTRIC MFG. CO.

St. Louis 21, Mo.

EMERSON-ELECTRIC Direct-Drive Exhaust Fons

Economical, efficient two-speed models available in 12", 16", 18", 24" and 30" blade sizes. Fully enclosed ball-bearing motors for all types of installations. Balanced overlapping blades operate quietly.





Allis-Chalmers-Va., W. Va.

THE WEST VIRGINIA ELECTRIC CORP., 208 Newton St., Fairmont, W. Va., has been named a distributor for Allis-Chalmers motors, controls, pumps, transformers, and drive equipment in four counties in West Virginia. M. A. McEntire is head of the company and H. F. Sargent is sales manager.

THE VIRGINIA-CAROLINA ELECTRI-CAL SALES, INC., 1000-1014 E. Main St., Norfolk, Va., is a new distributor for the company in several counties in VIRGINIA. R. STANLEY OSBORNE is president of this company and ROBERT C. DORSEY is vice president; WALTER C. BEAMAN is secretary-treasurer.

Rockwell Mfg.—K. C., Tulsa

C. K. MADISON, Southwest Regional Sales Manager of ROCKWELL MANU-FACTURING COMPANY, has announced the appointments of M. D. GILBERT as KANSAS CITY District Sales Manager and Roy R. Bush as Tulsa District Sales Manager.

Mr. Gilbert became affiliated with the Pittsburgh Meter Company in 1924 as Sales Representative for Southern Texas. When the company merged and became the Pittsburgh Equitable Meter Division of Rockwell Manufacturing Company, he was assigned to their Houston District Office. In 1944 he was promoted to Tulsa District Sales Manager, a position he held until his recent appoint-

Mr. Bush studied engineering at the University of Oklahoma and since that time has had twenty years of operational and sales experience in the drilling, production, pipeline and refining phases of the petroleum and gas industry. He was first affiliated with various drilling contractors and later the Texas Pipeline Company.

In 1934 Mr. Bush joined the Rockwell Sales Staff in the Tulsa area. He became Special Sales Representative for the company's Nordstrom Valve Division and in 1951 was appointed Sales Manager of Oil Field Products with headquarters in Pittsburgh.

Barber-Colman-Wheelco

It was announced recently that BARBER-COLMAN COMPANY, of Rockford, Illinois, will purchase the principal assets of WHEELCO INSTRUMENTS COMPANY, of Chicago. Wheelco products consist of indicating, recording, and controlling industrial instruments, and combustion safeguards.

Present plans are to continue current operations in Chicago until such time as manufacturing facilities can be gradually transferred to Rockford in a manner that will result in very little interruption in shipments. No changes are contemplated in Wheelco's national sales and service organization.

Georgia Tech-Lub. Course

THE GEORGIA INSTITUTE OF TECHNOLOGY in ATLANTA, GEORGIA, is conducting a two-week lubrication course from June 16 to 27, 1952. The ASLE is cosponsoring this instruction. Although the hydrodynamics as well as hydrostatic theories are to be introduced and discussed, emphasis is to be placed on industrial lubrication.

Practical topics such as Bearing Design, Bearing Materials, Lubricants, Lubricant Dispensing, Recent Lubrication Developments, Lubricant Technology, Rolling Bearings, Gear Lubrication, Textile Machinery Lubrication, Cutting Fluid Technology and Lubrication Section Organization will be presented on successive days by such authorities as Mr. John Boyd of Westinghouse, Mr. Oscar Frohman of Ampeo Metals, Dr. E. M. Kipp of the Aluminum Company, Mr. Andrew Cichelli of Bethlehem Steel, Dr. D. D. Fuller of Columbia University, Mr. Dean Cleveland of Bendix Aviation, Mr. C. M. Weckstein of Timken Roller Bearing, Mr. J. L. Brusca of SKF, Mr. S. D. Craine of W. A. Jones Foundry and Machine Company, Mr. Clark Hubbard of Deering Milliken Company, Dr. M. E. Merchant of Cincinnati Milling Machine and Mr. T. R. Witt of Tennessee Eastman Company.

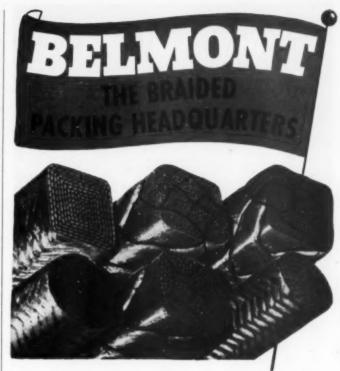
Dr. Joseph P. Vidosic of the School of Mechanical Engineering, Georgia Institute of Technology is the course director.

Foxboro-Ala., S. C.

Two new branch offices, in Decatur, Ala., and Greenville, S. C., are announced by The Foxboro Company, Foxboro, Mass., makers of precision instruments for measuring and controlling industrial process variables.

C. A. Mohler, Industrial Engineer, is in charge of the Decatur Branch. Mr. Mohler will provide sales and service to textile, paper, chemical and other plants of the region. Address of the new branch is 113 Lee Street.

The new Greenville Office is under the management of W. W. Barron, a veteran of more than 25 years' service with Foxboro, who moves to his South Carolina assignment after many



No one deliberately compromises with quality in vital braided packings. You're probably paying for the best, so why not make certain you're getting it—specify BELMONT, headquarters for braided packings in a wide range of types and materials.

Belmont braided packings are described and picturized in catalog No. 40. The type of braid is dependent upon the service conditions, and the materials used are asbestos, flax, cotton, jute, ramie, teflon and metals, lubricated for the purposes intended. Write on your company letterhead for details today.

Fast, direct help on technical problems... SERVICE through leading national distributors.

4442





For over 65 years, "Mason" No. 11
Pilot Operated Reducing Valves have been
a standard for steam pressure reducing
valves. Now new features make these
valves better than ever. They provide
greater accuracy of control...ease of operation and serviceability...longer life...
while maintenance is reduced to little more
than keeping the valve parts clean.

Compare These Advantages

- Wide range of adjustment, by means of handwheel, without change of spring.
- Indicator provides convenience in setting; automatic retaining device maintains set point during operation.
- Extremely sensitive responds instantly to any change in load.
- Rugged, compact, easily installed; may be serviced in the line since all parts are removable.
- Extreme precision in fitting and super-finishing of parts insures reliable, accurate performance—reduces maintenance to absolute minimum.

Your local Mason-Neilan Industrial Distributor Is Ready to serve you from stock; or Write—



Mason-Neilan Regulator Company 1206 ADAMS STREET, BOSTON 24, MASS., U.S.A.

Sales Offices or Distributors in the Following Cities: New York - Syracuse - Chicages
St. Louis - Tulua - Fhiladelphia - Houston - Fittsburgh - Atlanta - Clevelan
Cincinnati - Detroit - San Francisco - Salt Lake City - El Paso - Boise - Albaquerqu
Charlotte - Los Angeles - Denver - Appleton - Corpus Christi - New Orleans
Mason-Neilan Requistor Ce., Lod, Montreal and Toronto

news (continued)

years in charge of the Atlanta territory. At Greenville, Mr. Barron will be serving a variety of modern industrial plants, including the expanding textile firms in the area. New quarters have been set up in Greenville's South Carolina Bank Building.



B. G. Jordan, new manager of Tulsa, Oklahoma office of Sterling Electric Motors

Sterling Electric Motors Appoints Jordan—Tulsa

Opening of a new sales office in TULSA, OKLAHOMA, has been announced by STERLING ELECTRIC MOTORS, INC. The Tulsa office is located at 319 Castle Blvd.

Mr. B. G. Jordan has been appointed Manager of the Tulsa office. He is a graduate in mechanical engineering from the University of Oklahoma and is prepared to render application engineering service to the petroleum, industrial, chemical, agricultural and commercial requirements of the area.

ASWA Meeting-Atlanta

The Southern Chapter of the AMERICAN STEEL WAREHOUSE ASSO-CIATION met in ATLANTA on April 2 at the Ansley Hotel. Principal speakers were WALTER S. DOXSEY, president and secretary of the national Association, and ROBERT S. LYNCH, president of Atlantic Steel Company, Atlanta.

New chapter officers elected at this meeting are: president — Frank I. Clark, Steel Service of Carolina of Charlotte, N. C.; regional vice-presidents — E. E. Hoehle, Jones and Laughlin Steel Corporation, Memphis, Tennessee, W. E. Moore, Moore Steel Company, New Orleans, Louisiana and M. C. Sarran, Atlantic Steel Company, Atlanta. D. E. Dey, of W. L. Coston and Sons, Burmingham, Alabama, was elected secretary-treasurer, and chapter director is Frank Pin-

GEON, Pidgeon-Thomas Iron Company, Memphis, Tennessee. FRANK F. ROSE, Edgcomb Steel Company, Charlotte, N. C., was named publicity director.

Honeywell Assignments South and Southwest

Twenty-six sales engineers have been added to the field sales staff of the Industrial Division of MINNE-APOLIS-HONEYWELL REGULATOR COMPANY, it was announced recently. The new men have recently completed a 13-weeks intensive training course in instrument maintenance at the company's Brown training school in Philadelphia.

The men and cities to which each has been assigned include John S. Hafling, Louisville; John H. Tenison, Houston; Calvin L. Perilloux, New Orleans; Robert W. Smith, Kansas City; and Jack T. Teed, Tulsa.

Rust-Oleum-Md., N. C.

THE RUST-OLEUM CORPORATION, Evanston, Illinois, manufacturer of rust-preventatives, has announced the addition of five new industrial distributors to its Distributor Sales Organization.

The firms appointed include: The Adkins Company, Baltimore Avenue, Berlin, Maryland; and Mill and Contractors Supply Company, 121-3 Water Street, Wilmington, North Carolina.

Reliance-Houston

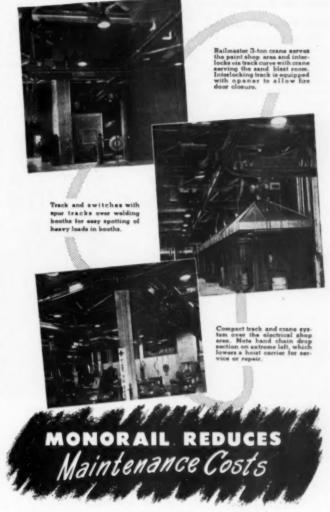
Appointment of HAROLD A. PLOCH as a sales application engineer in the Southwestern District Sales Office of the RELIANCE ELECTRIC & ENGINEER-ING COMPANY, 1304 Sterling Building, HOUSTON, TEX., has been announced.

In his new post, Ploch will represent the company as a sales engineer for Reliance a-c and d-c motors, packaged all-electric adjustable-speed drives, gearmotors, and related specialized motors and motor-drive equipment having a wide range of industrial application.

Republic Rubber-Tenn.

THE JOHN BOUCHARD & SONS CO., 1024 Harrison Street, NASHVILLE, TENNESSEE, has been appointed an Accredited Distributor of REPUBLIC RUBBER DIVISION, LEE RUBBER & TIRE CORPORATION.

As a distributor, the company will carry a representative stock of Republic's industrial rubber products.



In this, one of the country's largest maintenance shops, American MonoRail Overhead Handling Equipment serves the entire department. Included in the department are: machine shop, electrical repair, metalizing room, welding, painting and sand blast room, pipe shop, and inside and outside storage. This plant has shown a definite increase in efficiency and a great reduction in handling costs.

Let an American MonoRail engineer show you how you can cut handling costs and save valuable floor space.

WRITE FOR C-1 BULLETIN

THE AMERICAN COMPANY

13105 ATHENS AVENUE

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CLEVELAND 7, OHIO

news for the South and Southwest (continued)

NOPSI Personnel Changes

The resignation of W. J. Amoss, vice-president in charge of advertising for New Orleans Public Service Inc., and the appointment of J. Mason Guillory to succeed him as director of advertising was announced recently.

Amoss, who has been with the utility since 1931, is resigning to become executive vice-president of Valentine Sugars, Valentine Plantations Inc., and the Valite Corporation, a Louisiana company engaged in research and the manufacture of plastics and paper pulp from agricultural products. Will J. Gibbens, Jr., president of these companies, is a dictor of New Orleans Public Service Inc.

Guillory also has been with Public Service since 1931, serving in various engineering and sales positions. In 1940 he was appointed manager of the Industrial and Commercial Division of the company's Industrial Engineering and Utilization Department, which has the responsibility of advising customers on all uses of services provided by the company. Guillory was educated in New Orleans public schools, and at Tulane University, where he graduated in engineering in 1928.

Active in engineering and utility industry organizations, he is a past chairman of the Lighting Committee of the Industrial Power and Heating Section of the Edison Electric Institute.

Following Guillory's promotion to director of advertising, three personnel changes were announced in the Industrial Engineering and Utilization Department at Public Service.

JOHN F. MORTON, formerly supervisor in the Industrial Division, has been promoted to manager of that division.

JAMES L. CAMPBELL has been named manager of the Commercial Division, and CHARLES J. SINNOTT has been promoted to manager of the Residential Division succeeding Campbell.

BLAW-KNOX GRATING



Electroforged into rigid, one-piece panels.



Twisted cross bar prevents slipping.

BETTER SERVICE ON 5 COUNTS

1 SAFER FOOTING
2 GREATER STRENGTH
3 LONGER LIFE
4 LOWER MAINTENANCE
5 MORE OPEN SPACE

Bring your open steel flooring problems to Blaw-Knox for expert help. Bulletin 2365 sent on request.

Grating Department

BLAW-KNOX DIVISION of Blaw-Knox Company 2034 Farmers Bank Bldg., Pittsburgh 22, Pa.

BLAW-KNOX STEEL GRATING

Nordberg Mfg. Co.-Dallas

Appointment of WAYNE G. SLIFE as Sales Engineer in the DALLAS, TEXAS, office of the Heavy Machinery Division has been announced by Nordberg MANUFACTURING COMPANY.

In 1946, Slife was named General Manager of an electrical and industrial equipment distributing company. He retained this position until July, 1948, when he became associated with the Elliott Company as a field engineer handling that firm's municipal and industrial business in the southwest. He resigned this post in April, 1952, to join Nordberg Manufacturing Company.

Larkin Lectro Changes Name

Effective April 15, 1952, the trade style of LARKIN LECTRO PRODUCTS CORP., PINE BLUFF, ARK., was changed to "Central Transformer Corp."

This change has been made because the new name more accurately describes and identifies the organization's activity in the manufacture of liquid-immersed and dry type, power and distribution transformers.

For the purpose of establishing the relationship between "Larkin" and "Central," the trade style for the next two or three years will be carried as "Central Transformer Corp.," formerly Larkin Lectro Products Corp.

Allis-Chalmers-Memphis

New appointments announced for the ALLIS-CHALMERS general machinery division include George Wampler, manager of the Memphis district.

Wampler joined Allis-Chalmers in 1946 and was a sales representative in the Memphis district for four and one-half years before being transferred in November, 1950, to Chicago as manager of the warehouse sales unit there.

Diamond Alkali-Houston

DIAMOND ALKALI COMPANY has announced a change in its expansion plans which will increase chlorine-producing capacity by ten per cent at its Houston, Texas, plant.

This additional capacity, needed for the manufacture of perchlorethylene, originally was part of the expansion program at the company's plant at Painesville, Ohio. But Diamond now plans to construct the perchlorethylene unit at Houston because of more favorable market conditions.

Meanwhile, the company stated that at Painesville it had called a temporary halt to construction on the \$12,000,000 expansion project so that the program could be re-evaluated in the light of the Houston move. The Painesville expansion, which began last year, will require two years for completion and is designed to substantially increase the production of chlorine and caustic soda by the electrolytic method.

The perchlorethylene unit was expected to cost approximately \$1,000,-000 at Painesville.

Holmes-Darst-Knoxville

Announcement has been made by the Holmes-Darst Coal Corporation, KNOXVILLE, TENN., of the election to the presidency of the company of Mr. St. John Reynolds, succeeding Calvin Holmes who died February 23rd.

E. P. AVENT, for many years a Vice President and Director of the company, was elected Executive Vice President. Other officers elected are GUY DARST, Treasurer: NORMAN F. EDWARDS, Secretary; LILLIAS ROPP, Assistant Secretary and Assistant Treasurer; all of Knoxville.

Mr. Reynolds commenced his business career in 1915 as an office clerk with the Bewley-Darst Coal Company, a predecessor of the present firm. He has served successively through management and executive responsibilities, having been a Director of the company since 1933 and a Vice President since 1942.



THE safest way to prevent boiler water level accidents and costly shut-downs is the combination of visual and sound indications. You're doubly safe when operators can check EYE-HYE's convenient, clear-cut reading right at their control station augmented by the alarm on your Reliance Safety Water Column. You don't want that alarm to sound, but it's there, ready to prevent an oversight if gage-reading is delayed. Make doubly sure with the Reliance Safety Team. There's a Reliance Representative near you—glad to check your requirements—or write to the factory.

THE RELIANCE GAUGE COLUMN CO., 5902 Curnegie Ave., Cloveland 3, Ohio

The name that introduced safety water columnsin 1884

Reliance BOILER SAFETY DEVICES

news for the South and Southwest (continued)



Dowell Incorporated — 20 Year Service Awards

These ten men represent 200 years with Dowell Incorporated, one of the nation's largest oil well servicing and industrial cleaning firms with head-quarters in Tulsa, Oklahoma. Dowell is celebrating its twentieth anniversary this year and these men were those awarded 20 year service pins.

In the usual order: Dr. John Grebe, Midland Mich.; Charles Mangold, Tulsa; lames A. Cummin, Wichita: John G. Staudt, Tulsa; Robert D. Shaw, Tulsa; Dr. W. R. Veczey, Midland; Dr. A. P. Beutel, Freeport, Tex.; Nelson Griswold, Freeport; Dewey Wyman, Reed City, Mich., and Charles Prince, Shreveport.

TEMCO—Dallas, Texas

TEXAS ENGINEERING AND MANUFAC-TURING COMPANY, INC., DALLAS, TEXAS, long known throughout the aircraft industry as TEMCO, has changed its name officially to TEMCO AIRCRAFT CORPORATION.

The change in name was voted by the stockholders at their annual meeting at the company offices in Dallas.

York Corp.—Atlanta

WILLIAM T. HARRIS, who has been employed by YORK CORPORATION since 1936, has been named assistant to the district commercial sales manager of the air conditioning and refrigeration firm's Southern District with headquarters at ATLANTA, GA.

Harris succeeds A. H. Johnston, who resigned recently to become af-

filiated with Pittman-Singleton, Inc., York Corporation distributor in Fayettevile, N. C. His territory will include the states of Georgia, Florida, SOUTH CAROLINA, NORTH CAROLINA, ALABAMA, TENNESSEE and KENTUCKY.

Manning, Maxwell & Moore Houston and Tulsa

MANNING, MAXWELL & MOORE, INC., Stratford, Conn., recently announced that RAYMOND C. WEST and GEORGE F. BRIGHT have been assigned to new district manager positions.

Mr. West becomes Gulf Coast District Manager with headquarters in HOUSTON, TEXAS, while Mr. Bright is made Manager of the Mid-Continent District with headquarters in TULSA, OKLAHOMA.

Joining Manning, Maxwell & Moore, Inc., in 1942, Mr. West was first Office Manager in Tulsa and, in 1948, Mid-Continent District Manager. Mr. Bright joined the company in 1949 as territorial salesman.

Remington Rand Inc.-La.

JAMES A. WARD has been named General Manager of LOUISIANA ORD-NANCE PLANT, operated by REMINGTON RAND INC. Formerly assistant general manager of Remington Rand, Mr. Ward replaces T. C. Gerber who served as General Manager of the plant up to the time of his resignation.

A graduate of the Purdue University Electrical Engineering School, Mr. Ward has been associated with the company since 1942. His first position with the company was as director of maintenance.

Hughes Tool Cited for Safety

STEEL FOUNDERS' SOCIETY OF AMERICA, 920 Midland Bldg., Cleveland, Ohio, recently announced perfect safety records achieved by four steel castings companies during 1951 and exceptionally low accident frequency ratings for twelve others.

Setting the pace was Hughes Tool. Company, Houston, Texas, which completed its fourth successive year of accident-free operation, with no lost time accidents of any kind.

Harte Names Davis, Atlanta

JOHN J. HARTE Co., engineers and constructors of ATLANTA, GA., announce the appointment of WALTER C. DAVIS as General Sales Manager.

Mr. Davis, formerly manager of the Process Engineering Department of The Sharples Corporation, Philadelphia, has been prominently asso-

Nicholson W. O. Traps Are

LEAKPROOF IN SUPER HEAT

Nicholson weight-operated traps will not leak live steam, even though body may become completely dry due to re-evaporation. Unlike most bucket and float traps, Nicholson units do not depend on buoyancy of float to raise valve. Their extremely large orifices also keep valve clean, preventing blow-through. Working parts of stainless steel.

3 TYPES, for every heavy-duty use; pressures to 1500 lbs. Also for air and gasoline.



Catalog 751 or see Sweet's 175 Oregon St. Wilkes-Barre, Pa.

MODEL JR

W.H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

ciated with the chemical and process industries for a number of years, and has contributed many developments to this field.

Owens-Corning-La., Fla.

Establishment of new branch sales offices of OWENS-CORNING FIBERGLAS CORPORATION in TAMPA, FLORIDA, and NEW ORLEANS, LOUISIANA, has been announced.

A. C. WILSON, who joined the Fiberglas organization when it was



A. C. Wilson now Manager of Tampa, Florida, branch of Owens-Corning Fiberglas Corpora-



Walter Boden appointed Branch Manager Owens-Corning Fiberglas Corporation's New leans office.

formed in 1938, has been named manager of the Tampa branch. WALTER W. A. BODEN, associated with the company since 1942 and its resident sales representative in New Orleans since 1949, was appointed branch manager there.

The Tampa branch will serve Camden and Charlton Counties in Georgia and all of Florida, except areas west of Liberty and Franklin Counties.

The branch in New Orleans will serve southern Louisiana, southwestern Alabama, southern Mississippi and southwestern Florida, including Pensacola.

Conoflow-Tennessee

CONOFLOW CORPORATION, Philadelphia, announces the appointment of the EQUIPMENT SALES CORPORATION. 341-345 W. Market St., KINGSPORT, TENNESSEE, as representative serving eastern and central TENNESSEE as well as southwestern VIRGINIA with pneumatic control equipment.

Manufacturers' representatives in the area for the past six years, Equipment Sales is headed by S. E. ABER-NATHY and R. GLYNN THOMAS. Wellqualified in the instrument field, Mr. Abernathy was formerly chief instrument engineer for a large southern process industry, while Mr. Thomas was engaged in sales and service work for an instrument manufacturer.

Corning Glass-Kentucky

Construction by CORNING GLASS Works of a new Optical Glass Plant in HARRODSBURG, KENTUCKY, was announced recently. Contract has been awarded to DITMARS-DICKMAN-PICK-ENS CONSTRUCTION COMPANY.

The plant, which will employ about 250 persons, will contain 100,000 sq ft of floor space and is expected to be in operation by the year-end. HARRY S. STERLING has been appointed plant manager.



High grade gas, by-product, steam and household stoker coal from Wise County, Virginia, on the Interstate Railroad.



High grade gas, by-product, steam and domestic coal from Wise County, Va., on the Interstate Railroad. High grade, high volatile steam



and by-product coal from Wise County, Va., on the Interstate Railroad.



The Premium Kentucky High Splint unmatched for domestic use. Produced in Harlan County, Kentucky, on the L. & N. Railroad. COKE Roda and Stonega from Wise





High grade gas, by-product, steam and domestic coal-Pittsburgh seam from Irwin Basin, Westmoreland County, Pennsylvania, on the Penna, Railroad.

High volatile domestic, steam and by-product coal from Boone and Logan Counties, W. Va., on the Chesapeake & Ohio Ry.

Genuine Pocahontas from McDowell County, W. Va., on the Norfolk & Western Railway.

High fusion coking coal for by-product, industrial stoker and pulverizer use from Wyoming Co., W. Va., on the Virginian Ry.



Hazel Brook—Premium Lehigh Raven Run—Premium Mahanoy Cross Creek—First Grade Lehigh

Our engineering service, available upon application, and long and varied experience is your assurance of the Right Coal - Property Applied.

eneral

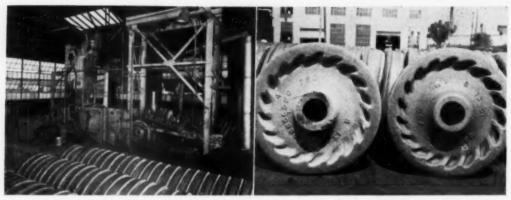
123 SOUTH BROAD STREET PHILADELPHIA 9, PA. CABLE ADDRESS, GENCO

Branches:

BLUEFIELD, W. VA. **HEW YORK** BUFFALO CHARLOTTE, N. C.

NORPOLK

CINCINNATI PITTSBURGH



Production cleaning line at Southern Wheel Division, American Brake Shoe Corp., Birmingham, Alabama. Cleaned wheel is emerging from the Wheelabrator cabinet at the left. Comparison of wheels before and after blasting is shown at the right. Wheel at left shows condition before blasting. Wheel at right shows surface condition after 30 seconds of cleaning.

Car Wheels Cleaned by Airless Blasting

ONLY 30 seconds' cleaning time is required to remove the sand and scale from a cast railroad wheel at Southern Wheel Division. American Brake Shoe Corp., Birmingham, Alabama, where a spe-

cially-designed airless blasting does the job on a production basis.

The machine for this application was designed by American Wheelabrator & Equipment Corp., Mishawaka, Indiana, Cleaning is accomplished by hurling steel shot abrasive with centrifugal force imparted by two Wheelabrator units. Spinner rolls inside the cabinet rotate each wheel under the blast stream so that abrasive reaches all areas of the wheel.

The cleaning room at this plant accommodates two days' production, the older of which is cool enough for cleaning. Each wheel is rolled onto the loading mechanism of the cabinet which consists of a curved, grooved arm which fits the flanged section of the wheel. When the loader is actuated, the wheel rises, rolls into the cabinet and onto the spinner rolls. At the same time, an elevator inside expels the cleaned wheel, which moves to a grinding operation for the removal of burrs and ragged edges.

Sand and scale removal was formerly done by air blasting with sand at the rate of 90 wheels per hour. The cleaning capacity of the present cabinet is considerably higher, even though its rate is currently held at 120 wheels per hour due to the time taken by subsequent operations in the line.

The labor crew in the cleaning room has now been reduced by one man and there has been a noticeable improvement in the surface cleanliness of the work, particularly where burned-in sand prevails. Work areas are also much cleaner, because a dusty condition previously associated with the sandblasting operations is no longer present.



Tube Stocks and Bending

TUBE CO. OF AMERIC

PITTERUPGH CHICAGO

McKEES ROCKS, PA. (Pittsburgh District)

FRED S. RENAULD & CO. LOS ANGELES

Southern Natural Gas Co. \$76,000,000 Expansion

SOUTHERN NATURAL GAS CO., BIR-MINGHAM, ALABAMA, has asked government approval of a \$76,000,000 expansion program to bring additional gas into Alabama, Georgia, and Mis-SISSIPPI.

This three-year construction program would also provide natural gas for more than fifty cities and towns in Alabama, Georgia, South Carolina, and Florida which do not now have natural gas.

Plans call for about 1,255 miles of high pressure pipe lines up to 24 inches in diameter. Some 22,250 hp in additional facilities would be built to pump the gas along the lines.

Texas Eastern Begins Pipeline Operation

TEXAS EASTERN TRANSMISSION CORPORATION has begun initial operations of its new 30-inch pipe-line as far north as the Ohio River, according to an announcement by R. H. Hargrove, president.

Construction and testing of that section of the new line which extends from Kosciusko, Mississippi, to the Kentucky-Ohio crossing of the Ohio River has been completed and Texas Eastern now is delivering gas to the Appalachian area through connections with the Columbia Gas System.

The remainder of the line is expected to be completed this summer.

L. B. Foster Co.—Houston

executives.

L. B. FOSTER COMPANY, suppliers of railroad trackage, steel sheet piling and pipe, announced the appointment of R. A. Anderson as Regional Manager for the Southwest Area, with offices in Houston, Texas.

nition of new developments and

current trends of the industry. The

course is conducted as a seminar,

with lectures leading into discussions

of various phases of this growing

science, making it of important value

to instrument, process design, and

operating engineers, and management

Mr. Anderson replaces the late J. B. STRAUSS, who had served as Regional Manager since the establishment of the Houston office.

A member of the organization for five years, Mr. Anderson was transferred to Houston in 1948 from the Chicago office.

Other offices of the company are located in Pittsburgh, New York, and Chicago.

Instrumentation Symposium

THE AGRICULTURAL AND MECHAN-ICAL COLLEGE OF TEXAS is having its 1952 Symposium on "Instrumentation for the Process Industries" on June 2, 3, and 4, at COLLEGE STATION, TEXAS. Held in co-operation with the many important industrial firms of the Southwest, the Meeting is jointly sponsored by manufacturers of instrument and control equipment, who provide extensive exhibits of an educational nature.

Designed to strike a balance between theory and practical experience, the program included subjects related to the measurement and control of process variables, with recog-





FOR almost a century Cole elevated tanks have provided a dependable water supply for mills and communities. Cole quality is assured by careful, experienced designing and watchful supervision from blueprints to finished tank. Send us your inquiries for tanks from 5,000 to 2,000,000 gallons—stating capacity, height to bottom, and location.

Write for latest catalog - "Tank Talk."

R.D. NEWNAN, GEORGIA

ELEVATED TANKS • VESSELS • CYLINDERS
TOWERS • BINS • STANDPIPES

New Equipment for Southern Industry

(Continued from page 10)

Concentrator Unit for Humidity Control Method

G-9

NIAGARA BLOWER COMPANY,
405 Lexington Ave., New
York 17, N. Y., is building
an improved model concentrator for
the drying agent used in the company's controlled humidity method of
air conditioning.

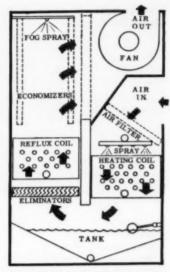
Method uses a drying agent to absorb moisture from air directly, reducing humidity without refrigeration; therefore it is applied to increase the performance of existing air conditioning systems as well as to processes and industries where materials are dried or protected from atmospheric moisture.

Drying agent is a liquid (Hygrol) which has hygroscopic properties that afford control of the relative humidity of the area or process that is conditioned. As it is diluted by the moisture it absorbs, a part of the liquid is pumped to the concentrator. In the concentrator this moisture is continu-

ously removed so that the air conditioning is always operating at full capacity.

Diluted liquid is sprayed into an air stream over heating surface which raises its temperature, evaporating the water from it. The air stream then passes through eliminator plates which remove the liquid drops. In a second stage, it passes over a cooled reflux coil which raises the relative humidity in the chamber, condensing the absorbent vapor. In third stage (the "economizers") it passes through filtration cylinders each of which contains a fog nozzle. Here the building up of every high humidity completes the condensation of the absorbent liquid and its droplets are caught by the filters while the moisture laden air passes through. The re-concentrated absorbent drains to the tank in the base, from which it returns to the air conditioning unit, completing the

Using this method, the consumption of liquid absorbent has been re-



Flow diagram of Niagara Blower Company's Concentrator for use with the company's controlled humidity method.

duced to a point where it is of no importance in practical operations. It is successfully applied to a large scale air conditioning and drying systems involving high concentrations. In one installation where the charge of liquid was 2,000 gallons there was no measurable consumption of liquid in 168 hours continuous operation.

Continuous "V" Packing

G-10

FLEXBOCK COMPANY, Mechanical Packing Division, 3670-B Cuthbert St., Philadelphia 4, Pa., announces a new, continuous, chevron-type packing, designed for 500-6000 psi, and available in styles for either high or low temperatures.

The user cuts his own rings on the job to fit specific rod and stuffing box dimensions. Thus, for a given packing size, the "Continuous-Vee" eliminates the need for stocking a number of different sets of "V" packing.

Style No. 2005 is constructed of the best asbestos cloth and neoprene and is recommended for high temperature service on reciprocating steam or air rods, hot oil pumps, etc. No. 2008 is for lower temperatures and is made of the best cotton duck and neoprene and is recommended for hydraulic rams, outside packed plunger pumps, etc., handling oil or water.

For more data circle item code number on the postage free post card—p. 17

Hanzel FORCE FEED LUBRICATORS

... A "CREW" of NEVER-FORGETTING OILERS

 With Manzel Lubricators you know every wearing point is always receiving exactly the amount of oil it needs. Manzels don't forget or make mistakes.
 As a result machinery operates efficiently for many more years.

Standard equipment on leading makes of presses, engines, and other machinery, they can also be installed on your present equipment.

We will gladly have a Manzel lubrication engineer submit recommendations without obligation. Just write...



Why it Pays to Select Manzel Lubricators

- . THEY CORRECTLY LUBRICATE EACH POINT
- . THEY ARE AUTOMATIC AND TROUBLE-FREE
- THEY ELIMINATE "DOWN TIME"
- . THEY CUT OIL CONSUMPTION UP TO 90%

Manzel

318 BABCOCK STREET BUFFALO 15, NEW YORK

Centrifugal Pump Design

G-II FOOD MACHINERY AND CHEMICAL CORP., 301 West Avenue 26, Los Angeles 31, Calif., recently announced a new line of horizontal, split-case, general service pumps featuring the use of standard mechanical shaft seals, instead of conventional stuffing boxes, thereby obtaining savings in floor space, shorter shaft lengths, improved performance characteristics and easier pump servicing.

This line of pumps, designated as the Peerless Type AS, is available in discharge sizes from 1½ in. through 4 in. Capacity range is up to 750 gpm and head range is up to 230 ft. General application is for pumping water and clear liquids up to 200F where no solids are in suspension.

Because the Type AS is of the horizontal, split-case design, removal of the top half of the pump case for inspection and maintenance of the rotating elements is easy, quick and simple. The entire rotating element can be lifted from the case for inspection, repair or repfacement without disturbing pump alignment, or connections to the pump. The entire rotating element can then be disassembled with ordinary tools.

All types of drives are available with the pump, including direct-connected electric motor through a flexible coupling, gasoline engine and steam-turbine drive.

Use of standard mechanical shaft seals, instead of conventional stuffing boxes, one feature of Peerless Fumpivision's new line of general purpose horizontal centrifugal pumps.



Three Stage Deaerator

G-12

THE PERMUTIT COMPANY,
330 West 42nd Street, New
York 36, N. Y., has developed a new deaerator with internal
direct contact vent condenser.

The deaerator not only reduces installation costs by avoiding the need for vent condenser bypass piping and saves head room, but it reduces maintenance costs by eliminating the need for cleaning or replacing tubes of the



Permutit's new deaerator has internal direct contact vent condenser.

customary tubular vent condenser.

Unit heats and deaerates water in three stages. The first stage heater is primarily a vent condenser or compartment for concentrating the noncondensable gases before discharging them to the atmosphere so as to reduce to a minimum the loss of steam.

Bulk of the heating and removal of non-condensable gases is accomplished in the second stage or spray compartment. The hot and partially deaerated water passes from this stage to the third or reboiler scrubbing stage for final and complete deaeration.

The fresh oxygen-free steam passes through the steam scrubbing reboiler where the dissolved oxygen in the water is reduced to zero. Upon leaving the reboiler, the steam enters the spray compartment where most of it is condensed in heating the water. Non-condensable gases such as oxygen, carbon dioxide and nitrogen are driven out of the water. To keep these gases from excessive concentration, a portion of the gas mixture must be removed from the spray compartment continuously.

JEFFERSON

300_{LB}. Trouble Free Unions for Tough Jobs

Jefferson Unions are made of Air Furnace Malleable Iron of an average tensile strength of 55,000 p.s.i., with a yield point of 36,000 pounds and an elongation of 15% in two inches.

Our seat rings are cut from seamless drawn brass tubing, free from all casting defects—sound and uniform always.

They are accurately tapped at all times; are carefully air tested and inspected before shipment, and each and every one approved only if they meet our rigid standards of inspection.

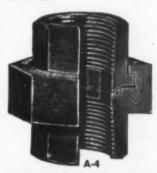
> Slightly Higher Priced But more than worth it.

See these outstanding features-

- * A ground ball joint to give leakproof service
- * Octagonal with square corners fits any type of wrench
- * No gasket required, hence no maintenance problem
- * Hot-dip galvanized to Government Standard for corrosion resistance

Made in all thread sizes from %" to 4" American Standard Taper Threads.

Also manufacture Excel 250 lbs and Master 150 lbs. All unions can be furnished with all-iron seats.



JEFFERSON Union co.

650 WEST 1616 St., NEW YORK I. 79 GOODING ST., LOCKPORT, N. Y 45 FLETCHER Ave., LEXINGTON, MASS.



Install Labor-Saving JERGUSON STEAM GAGE UNITS

. . . with gage and valves furnished as integral unit . . . without gage connection stuffing boxes or end stems.

JERGUSON Steam Gage Units, with gage and valves fabricated as a complete working unit will help you eliminate a lot of your maintenance time and troubles.

Especially designed to cut maintenance time, these complete units have no gage connection stuffing boxes to take care of and no end stems to cut or wire draw.

Gages and valves are an integral unit and have special expansion coils to take care of expansion and contraction. Transparent gage may be rotated to any desired angle; chambers and covers are forged steel; glasses are mica protected against erosion. Available in various models for required visible glass and W.S.P.

Cut your maintenance costs now. Write today for copy of drawing GD-515 and Steam Gage Data Unit.



JERGUSON GAGE & VALVE COMPANY

100 Felisway, Somerville 45, Mass.
Representatives in Major Cilies
Flam Listed Under JERGUSON
Jerguson Tress Gags & Volve Ca. Ltd., London, Eng.

Diaphragm Regulating Valve

G-13

Leslie Co., Delafield Ave.,
Lyndhurst, N. J., has announced a new double seated
diaphragm regulating valve for use
with control instruments.

Among features of the new valve is its "Flow-Line" contoured body. This has been designed to provide ISA standard face-to-face dimensions with the highest capacity, lowest turbulence and body pressure drop.



Renewable interchangeable seat rings feature of Leslie Company's valve available in sizes from 1½ to 10 in. for pressures up to 600 psi.

Renewable interchangeable seat rings are another important feature. These rings are machined so accurately that they can be removed and replaced without removing the valve body from the pipe line. Simplified maintenance eliminates the practice of removing the body from the line and setting it up in a lathe to replace the seat rings. It also eliminates elaborate grinding operations at high temperatures.

Another important feature is the renewable self-aligning guides. These top and bottom guides cannot bind regardless of bolt tightening because they are self-aligning.

Four sizes of superstructures are available, with from 50 to 210 sq in. of effective area, designed to operate on 3-15 psi air, used with standard instrument controllers.

30 Ton Hydraulic Ram

OWATONNA TOOL COMPANY,
395 Cedar St., Owatonna,
Minn., announces a new 30
Ton Power-Twin Hydraulic Ram similar in design and with the same features as the 17½ ton ram but having almost twice the power.

The new ram does pulling and installing jobs, works in any position, is fully adjustable, eliminates torque and takes the hard work out of pulling and installing operations. It is 6% in. high, 7½ in. wide, 3 in. thick and has a 2½ in. ram travel.

Both the 17½ and 30 ton rams work off the same size pump which operates by remote control to insure safety.

Complete sets of attachments are available for industrial plant maintenance and a wide assortment of pulling and installing operations.

Variable Speed Unit

G-I5 STERLING ELECTRIC MOTORS, INC., 5401 Anaheim-Telegraph Road, Los Angeles, Calif., announce the addition of Type KFEA variable speed units with single reduction gears in ratings of 20 and 25 hp.

These units are manufactured in speeds of 728 rpm and lower with infinite speed adjustment within the ranges of 2:1, 3:1 or 4:1.

Features of the drive are: positive adjustment of pulleys, accurate maintenance of speeds under varying loads, belt tension in proportion to load, positive oil seals, single train helical gears, Herringbone Rotor, and direct-through ventilation. All ratings are available with drip-proof or splash-proof construction.

One of the new 25 hp single reduction models of Sterling Electric Motors. Inc. with a speed variation of 4:1 and output speeds of 324 rpm down to 81 rpm.



new equipment (continued)

For more data circle item code number on the nestage free post card—p. 17

Fischer & Porter unit measures by-pass flow rather than static head. Cell is connected across the critice plate in line with usual critice-metering procedures. It can handle pressure differential causes a fraction of the flow to pass through the lead lines, range tube, and variable-area flow meter. Carefully balanced float, riding freely in its tapered tube, is supported at a height determined by the flow. Float, completely free of mechanical linkage and attachments, carries two small Alnico magnets which couple it to the yoke of the follower arm without the need for pressure seals, bearings, or bellows.

Pneumatic transmitter translates the position of the arm into air pressure and sends this signal, linear with flow, to a receiver instrument.

To satisfy wide metering requirements, the V/A Cell is manufactured in two models: one with working pressure rating of 1040 psi at 350 F or 1200 psi at 100 F; the other rated at 2600 psi at 350 F or 3000 psi at 100 F.

Orifice Metering Technique

G-16
FISCHER & PORTER COMPANY, Hatboro, Pa., has introduced to industry an
entirely new approach to orifice mutering with a new product, known as
the V/A Cell.

Instead of measuring the staticpressure differential across the orifice (as do conventional mercury manometers) the new unit meters a continuous by-pass stream around that orifice. Thus, the metering is kinetic —a constant flow continuously purges the lead lines.

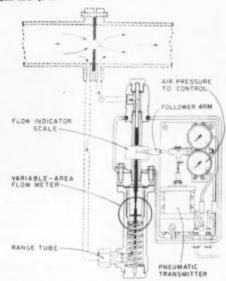
Second, a linear relationship exists between the metered by-pass flow and the main flow past the orifice—avoiding the square-root relationship between manometer action and orifice flow which has so long plagued orfice metering. The linearity and the consequent ten to one rangeability is inherent in the new method.

Third, the new method permits very simple adjustment of the by-pass rate, to give the unit enormous flexibility (usefulness over widely different flow ranges).

It is also adaptable to pneumatic connection to points remote from the orifice run.

In the steam power water treatment and water supply fields these characteristics mean (1) elimination of condensate pots in exposed locations, (2) greater chart (linear scale) accuracy at low flows, and consequently more exact ratio control (as in chlorination or adding water-treatment regents), (3) enough rangeability to handle variation of steam or water demands with the season or the connected load, and (4) simple central panel control through pneumatic linkage.

The principal parts of the V/A Cell are: a variable-area meter whose



float position inside a tapered tube changes with flow; a balanced follower arm, magnetically linked to the float; and a pneumatic unit for transmitting flow-rate measurement to remotely-located recorders, indicators, totalizers, ratio controllers or other receiving instruments.



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PAYROLL ENVELOPE*

is, in itself, a complete, simplified payroll system. Used nationally and known everywhere as the "4-in-1," this envelope cuts costs four ways—

- Reduces bookkeeping time in preparing payrolf
- 2. Provides accurate tax record
- 3. Protects employer with receipts
- 4. Simplifies, speeds on-the-job paying

*Two types—Regular and Carbonized (non-smear)

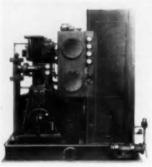
Write today for samples and estimates.



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Semi-portable oxygen generator of loy Manufacturing Company can produce high purity oxygen at a reported operating cost of five to ten cents per 100 cu ft.

Oxygen Generating Unit

G-17 MANUFACTURING COM-PANY, Henry W. Oliver Bldg., Pittsburgh 22, Pa., has announced the development of a semi-portable oxygen generator that will enable industrial users to produce their own high purity oxygen at reported savings up to 50 per cent.

Applications include the steel, glass, metal fabrication, chemical and process industries.

The generator is a compact unit requiring a space of 600 cu ft (8 by 7½ by 10 ft). Simplicity is its keynote and it has a minimum of moving parts. The machine has no dependence on chemicals and nothing is consumed except air and power.

Heart of the Joy oxygen generator is a series of automatic reversing heat exchangers which eliminate the expense of chemical purification of the air and contribute to high efficiency.

Packaged Automatic Fire Extinguishing Systems

WALTER KIDDE & COMPANY,
INC., 40 East 34th St., New
York 16, N. Y., has introduced "packaged" automatic carbon
dioxide fire extinguishing systems,
available for installation by the customer.

Designed to protect normal industrial types of flammable liquid hazards of up to 6,000 cu ft, the new system may be adapted for protection against some special hazards. However, cus-

tom-engineered installations probably will continue to be required for areas where carbon dioxide, hydrogen, carbon disulphide, butane, propane, etc., are stored.

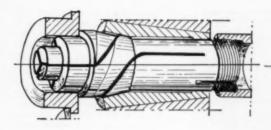
Each package contains temperaturerate-of-rise fire detectors and connector tubing, automatic control heads, discharge heads, Multijet nozzles, and a cylinder-supporting frame. Cylinders are shipped as a separate item.

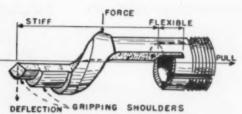
Accessory equipment is not included in the basic package, but may be ordered separately. The systems may be ordered with or without pipe and fittings. If pipe and fittings are ordered, they are strapped together and shipped along with the carbon containing the working parts of the system. Necessary lengths and elements for each system are packaged in individual boxes and may be ordered as a single unit.

Among the accessory items available are remote control pull boxes for manually actuating the system from one or more locations other than at the cylinders, and pressure-operated trips that can be installed to close weight-operated doors and windows automatically when the system discharges, thus excluding oxygen and preventing escape of fire-killing gas. Provision can also be made for shutting down ventilation and machinery by inclusion in the system of pressureoperated switches. Alarm gongs and pressure-operated sirens are also available.

Components of the smallest Walter Kidde Standard Pak system are spread on the floor. One pressurized 50 lb cylinder of carbon dioxide supplies both extinguishing agent and power for system. Inset shows automatic control head.







Slotted Mandrel for **Holding Work Pieces**

THE E. WESTBERG CORPORA-G-19 TION, 800 Beley Ave., Syracuse 11, N. Y., is offering the Colletmandrel, a reversed collet which grips the work piece from the inside surface.

All the advantages of a collet re-

main in this new type mandrel which consists of one piece which grips and releases the inside of the work with the same maneuver as a collet grips and releases the outside. It is made to fit all machines that are designed for the use of collets. The same standard numbering system is used.

The Colletmandrel has one or more gripping shoulders, each size having a Colletmandrel of E. Westberg Corporation is slotted to form three cantilever sections that deflect to positively engage work piece.

range of more than 1/32 inch. They are made of oil hardened alloy steel, recommended for collets and mandrels. The threads are also hardened and ground on all standard Colletmandrels.

Telescopic Work Tower

ATLAS INDUSTRIAL CORP... 849 39th St., Brooklyn, G-20 N. Y., has announced the new Hi-Lift Telescopic Tower for heights above 30 ft. It starts as a 6 ft tower and extends to its full height in less than 5 minutes.

The electrically operated tower is easily handled through door and elevator openings, can be operated by one man and may be partially extended to any desired height.



All-Purpose Gate Valve

AMERICAN CHAIN & CABLE Co., INC., Reading-Pratt & G-21 Cady Division, Reading, Pa., recently announced a new bronze

solder end gate valve.

An all-purpose gate valve, the No. 90 is said to be ideal for hot and cold water lines or low pressure steamin plumbing, heating, and air conditioning systems in industrial plants and other installations.

According to the manufacturer, this bronze gate valve provides full, unobstructed service flow and has a sturdy, amply-sectioned body that will not distort: nor will its seat warp under soldering temperatures. For use with K. L. and M copper tubing.



Pressure Reductions From 600 Lbs. to Ounces

JUST ONE

with a SQUIRES VERTICAL REDUCING VALVE

EXHAUST Broad, one-step reduction with a tingle valve is an important investment economy you make when you buy SQUIRES Vertical Reducing Valves. Most important to you, however, is the steady, dependable pressure control you get with SQUIRES. It maintains a positive, constant reduced pressure water. It is a positive dead-end, single-sented valve.

With SQUIRES, you are also investing in dependable, trouble-free operation year after year. Operating and maintenance costs are low. There is easy access to all working parts without breaking main connections.

Before deciding, get all the facts for yourself about SQUIRES Vertical Reducing Valves, Write today and ask for Bulletin 2183.

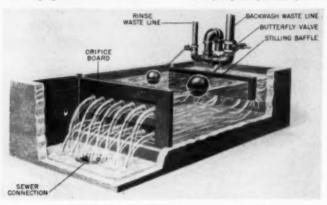


E. SQUIRES COMPANY

Over 50 Years of Dependubility

18530 SYRACUSE AVENUE . CLEVELAND 10, OHIO

new equipment (continued)



Permutit's Anti-Back-Siphonage Wash and Rinse Controller.

Back Siphonage Controller

THE PERMUTIT COMPANY, 330 West 42nd St., New G-22 York, N. Y., has developed a new Anti-Back-Siphonage Wash and Rinse Controller, designed to prevent excessive rates of flow during backwashing or rinsing, and to eliminate the possibility of back-siphonage of waste water.

The arrangement is standard on all of the company's sodium zeolite softeners that are 54 in. in diameter or larger. It can be provided for hydrogen zeolite, anion exchange, and pressure type filter equipment whenever local requirements call for it.

Water flows at a constant rate through orifices of fixed size, under a constant head maintained by the utilization of a float-operated butterfly valve. Thus, greater than normal pressure does not affect the rate of

The waste water discharge line terminates at a minimum distance of 6 in, above the rim of the sump. This prevents backflow of water from the sump in the event that negative pressure should occur in the water supply system during the backwashing or rinsing operation. A stilling baffle prevents turbulence in the constant level water chamber, thus avoiding irregular action in the float.

Packaged Steam Generator

BOILER ENGINEERING AND SUPPLY COMPANY, Phoenixville, Pa., has announced a new fully automatic and self-contained, packaged steam generator, said to be easy to install, highly efficient, and economical to maintain.

One of the boiler's important features is that front and back can be opened in 15-20 minutes, providing ready access for interior cleaning and

INEXPENSIVE

water heatin

Heat water in small tanks by direct injection of steam with the

SARCO THERMOTON TYPE S

It combines the function of a silent steam nozzle with approximate temperature control. Prevents boiling over; shuts off automatically when no water is drawn; conserves steam.

Sizes 1/2" to 2", pressures to 200 psi

Ask'for Bulletin 551

SARCU COMPANY, INC.

EMPIRE STATE BUILDING, NEW YORK 1, N. Y. Represented in Principal Cities

PRESSURE VESSELS



Finnigan pressure vessels, fabricated from steel or from allaysstainless, stainless clad, nickel clad, aluminum, or copper silicon meet ASME code requirements and are built to your specifications. Flanges and tappings can be made in any dimension and at any point on the vessel-or the entire vessel designed by our engineering department to meet a particular requirement.

Write or wire today. One of our engineers will discuss your problem with you.

J. J. FINNIGAN CO. 455 MEANS ST., N. W. ATLANTA, GEORGIA

VERTICAL BOILERS

ALUMINUM . COPPER . STAINLESS STEEL . STAINLESS CLAD TANKS STEEL SMOKESTACKS . SMOKE BREECHINGS . AIR COMPRESSOR TANKS

Meking Stepes from Soller Plate Date Sightner Stanford and Sighty-Sight

Books for the Plant Engineer

Elementary Heat Power

BY SOLDERG, CROMER, AND SPALDING PUBLISHED BY JOHN WILEY & SONS, INC.

440 Fourth Ave., New York 16, N. Y.

Price, \$6.50

Prepared as a text to be used in a first course in Heat Power preceding a thorough course in Engineering Thermodynamics, or in a terminal course for non-mechanical engineering students, "Elementary Heat Power" will also be useful for those who, after several years of experience in the various fields of heat power, wish to arrive at a better understanding of the principles behind the equipment they operate.

This second edition has been expanded by about 100 pages, principally to permit the discussion of the general energy equation of the steady flow process as the first law of Thermodynamics and its application to power plant equipment, and to include a fairly complete discussion of engineering units and dimensions.

industry, corporation executives, and others interested in accounting and economics. Subjects covered include Classification and Description of Accounts; Financial Statements and Reports; Property, Plant and Equipment; Manufacturing Cost; Sales Engineering and Administrative Expenses; Pensions; Internal Control and Auditing; Cost Estimating and Its Uses; Profit Planning and Budgeting; Recognition of Changing Value of Dollar; and the bibliography and index.

Selling to Industry

BY BERNARD LESTER

Published by the Industrial Press 148 Lafayette St., New York 13, N. Y.

255 pages

Price, \$3.50

This is a compact, pocket-size book that has been written as a manual of practical ideas and suggestions for the sales engineer who wants to analyze and improve his methods of finding, contacting, selling and servicing industrial customers. The author sets forth in a brief and realistic way those key points which have, from experience, been found to be most effective.

Renovating Old Cast Iron Pipe

(Continued from page 90)

flush with the edge of the central disk. But the cast iron pipe, resting on the flat, outside ring, overhangs the trench. This overhang is necessary because of the variable inner surface of the worn cast iron. However, there is always at least one-eighth inch between it and the new lining.

Having secured the pipe to the base, the next step is to attach the shrink head. The head takes care of any grout overrun. It is about eight inches high and is made up of two split sections of Transite pipe. The split sections are clamped

The Nature of some of our Physical Concepts

BY P. W. BRIDGMAN

PUBLISHED BY PHILOSOPHICAL LIBRARY 15 East 40th St., New York 16, N. Y.

Price, \$2.75

The three lectures reprinted were given at the University of London in the spring of 1950. The object was to distinguish between the "instrumental" and the "paper and pen" component of the operations of the physicist. In the first lecture, the concepts of field and empty space are examined, and it is shown that there is no instrumental operation by which action at a distance can be distinguished from action through a field. In the second lecture the fundamental concepts of thermodynamics are examined, and in the third the phenomena of conduction of electricity in massive conductors.

MAPI Accounting Manual

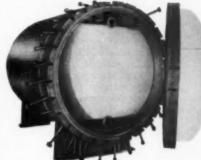
PUBLISHED BY MACHINERY & ALLIED PRODUCTS INSTITUTE

120 South LaSalle St., Chicago 3, Ill.

Price \$15.00

The new MAPI Accounting Manual is prepared for financial officers of

BLACKBURN-SMITH REFINER



SAN SOUARE FOOT REFINED

SAVES MONEY!

- Breaks tightest oil emulsion in water.
- 2. Saves heat units and
- J. Reduces beiler maintenance costs.
- 4. Simple, inexpensive operation.

CLARIFIES CONDENSED RETURNS OF ALL EMULSI-FIED OR FREE OILS . . . WRITE FOR CATALOG

The REFINER represents an outstanding achievement in pressure leaf filters, designed for extremely fine filtration and for the removal of both emulsified or free oil from condensate down to less than 1 ppm.

Existing installations prove beyond a doubt the effectiveness of the Refiner, which enables operators to re-use condensate formerly discarded because of the oil content.

REPRESENTATIVES WANTED

BLACKBURN-SMITH MFG. CO., INC.

Phone: Huboken 3-4425 99 River Street, Hoboken, N. J. Subsidiery of Condenser Service & Engr. Co., Inc.

Ractor 2-9360 together by a metal band. Then the shrink head assembly is secured in place by a hold-down stick bolted to the upper flange of the cast iron.

All of this assembly work (locating and locking the cast iron pipe and Transite pipe in place) is done in a horizontal position. Then the whole arrangement is raised to a vertical position.

The actual grouting job takes only a few minutes. It is a mixture of portland cement and water. No sand is used.

After reporting the above method in *The Power Specialist*, Johns-Manville remarks that the question usually arises, "If it is so resistant and strong, why not use it alone?" The answer is that Transite can be used alone. But, by salvaging the remaining strength of the cast iron, the mining company is able to use a thinner walled Transite. The result is a pipe that is immune to corrosion; will not disintegrate; and economically combines old and new to provide necessary strength.



636 So. Federal Street, Chicago 5



Conveyor Belt Repairs

(Continued from page 96)

piece, fastening it with belt fasteners all around the patch. Cement all edges thoroughly. Where it is necessary to prevent seepage of fines through belt repairs, remove one ply of fabric from a belt remnant and place it under the fasteners and rip plates.

Vulcanized patches are superior to those described above, but require the addition to the kit of a portable vulcanizer, rubberized fabric, tie gum, cover stock, a oneply knife and fabric pliers. In preparing a vulcanized patch, work down into the damaged belt as far as necessary by removing progressively smaller blocks of fabric with each successive ply. Clean, roughen and cement the cavity, neatly fit in blocks of new fabric and finally apply the uncured cover. Skive the edges of the patch flush, and vulcanize. Such patches cannot be made successfully unless the belt is dry, because the presence of moisture will permit the development of internal steam blisters.

Condensate Drainage Control System

(Continued from page 83)

portant, intermittent action of trapping to atmosphere results in intermittent loss of pressure and temperature head in the steam spaces when the traps are open and discharging at maximum volume. This causes non-uniform heating conditions in the dryers and press platens and results in spoilage and relatively slow production rates.

About two years ago, we installed a Cochrane condensate drainage control unit designed to operate at high pressure, returning the condensate at the temperature at which it is formed (about 350 F, because of radiation losses) directly to the boiler. The net result has been an impressive increase in production due to more uniform drying temperatures—the dryer can now be run faster. The boiler carries the load (about 125 per cent of rating) without pres-

sure variation because of the higher temperature makeup.

Drainage Control System

The Cochrane CB condensate drainage control system is essentially a specially designed centrifugal pump which draws water from the thermo-fin priming loop and discharges it as a high velocity jet through the jet pump nozzle as shown in the accompanying illustration. The jet strikes the returning hot condensate and induces condensate flow through the Venturi-shaped mixing tube and into the thermo-fin priming loop. This additional volume of condensate introduced into the constantly filled loop results in the discharge of an equal volume through the air separating chamber and into the boiler.

The hot condensate and entrained air are drawn rapidly and positively from the steam coils and steam-heated platens by the jet pump. The air is eliminated from the circuit by passing through the reduced-velocity air separating chamber from which it is automatically vented and the condensate is returned directly to the 150 psi boiler at only a few degrees less than steam temperature.

Thus the circuit from the boiler, through the steam-heated equipment, and back to the boiler is completed in a closed system without substantial drop in temperature. The continuous performance of the unit is verified by the pressure gauge on the inlet together with the pressure gauge and thermometer on the outlet.

Conclusions

While the fuel savings possible from the return of condensate directly to the boiler at only slightly less than steam temperature is admittedly impressive, it is of little importance in our operation where waste wood scrap serves as fuel. The outstanding advantage in our plant is the maintenance of a high back pressure on the steam coils and press platens, permitting constant uniform high steam space and surface temperatures, thus maintaining increased production rates and improving the quality of the plywood.

Catalogs and Bulletins

Free additional information is available to readers of Southern Power & Industry. Check item number on the postage free service coupon post card—page 17.

These plant operational aids start on page 16.

B-10 V-BELT DRIVES—Catalog Section 50 A 32 pages—Simple formulas for standard quarte curr and V-flat drives are augmented by the sections, which have so drives in all pell sections, which have not recompiled for quick selection of drives of recompiled for quick selection of drives of recompiled for quick selection of drives of recompiled for quick selection on other types of V-belt drives—PORT WORTH STEEL & MACHINERY COMPANY, P. O. Bex 1638, Fort Worth, Texas.

B-11 WHAT'S A SHJCONE?—Catalog. 3d pages—Defines afficones. Discusses are effective explosed to weather, exposed pump exposed to weather, exposed pump bearings in core even circumptant, trolley bearings in core even circumptant, trolley bearings in core even circumptant, and other applications. Protective coatings are described, including silicone aluminum finish for powerhouse stacks, silicone-based paint for hot metal surfaces, etc. Other subjects are electrical insulation, Silastic, defonmers, release agents, fluids, water-repellents, and polishes.— DOW CORNING CORPORATION, Midland, Mich.

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B-13 ADHESIVES AND COATINGS—Bulletin. 22 pages—3M Adhesives, Coatings, Sealers, designed to cut costs, reduce maintenance, and increase operating efficiency, are described, with tables listing product number, color, base, solvent, viscosty, solids content, new weight, application, uses, Corrosion and abrasion resistance, high immediate strength, and other features of the various products, aid in the reduction of maintenance.—MINNESOTA MINING & MFG, CG, Adhesives & Coatings Division, 411 Piquette Ave., Detroit 2, Mich.

B-14 ICE AND FRONT—Bulletin 651-B, 16 pages—Describes large four-cyl-inder compressors, including general design, crankcase, cylinders, capacity controls, and other components, Illustrated with line diagrams, equipment photographs, and pictures of actual installations.—FRICK CO., 220 Broadway, Waynesboro, Pa.

B-15 OH. BURNERS—Catalog. Form AD-162. 8 pages—Describes complete line of Rev-E-Oil Rurners for industrial use. Illustrates various sizes and capacities, including burners with maximum capacities of 5 gal in 69 gal. Discusses oils to be used in operation. Gives specifications.—CLEAVER-BROOKS COMPANY, 226 East Keefe Ave., Milwanker 12. Wis.

B-16 SMAIL PURIFIES—Italietin 500. 6 pages—Describes small line type Hi-eF Purifier, and explains functions for zee in cleaning up small pipe lines carrying live or exhaust steam, vapors and air, on various types of equipment. Contains diagrams of typical installations, specifications, and prices—THE V. D. ANDERSON COMPANY, Purifier Division, 1935 West 96th St., Cleveland 2, Ohio.

B-17 STEAM GENERATORS — Booklet, 12 pages—Historics and describes the automatic, self-contained Clayton steam process, and the self-contained Clayton steam process, and the self-contained Clayton steam processes in given.—CLAYTON MANU-FACTURING COMPANY, El Monte, Calif.

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simple method of determining correct horsepower requirements with the use of an orddrawings, selection charts, and dimension
tables for both concentric-shaft and rightangle shaft gear-motors, and other pertinent
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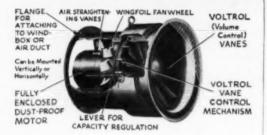
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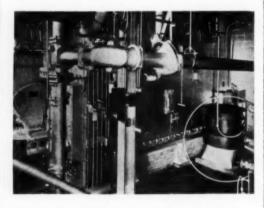
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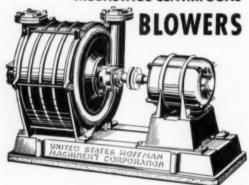
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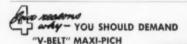
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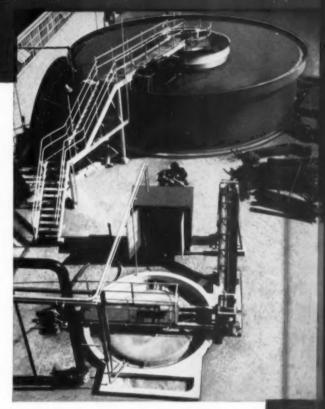
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Permutit Research in Ion Exchange Produces Higher Efficiency Demineralization . . .

99.9995% PURE WATER

WITHOUT DISTILLATION!

PERMUTIT MIXED BED DEMINERALIZER DELIVERS WATER PURER THAN ASTM REQUIREMENTS FOR REAGENT WATER*

Reduction of electrolytes to less than 0.2 ppm (specific resistance approximately one million ohms-cm) and silica to less than 0.05 ppm is readily obtainable. In actual practice, specific resistance as high as 24 million ohms-cm has been achieved. Purity of Permutit Mixed Bed Demineralized water exceeds ASTM requirements by over one full decimal place. By comparison, most commercial distilled water contains from 2 to 10 ppm electrolytes. Yet the cost of distillation far exceeds that of Mixed Bed Demineralizing for most normal water supplies, requires more time, and uses equipment that takes up far more valuable space.

*Tentative specifications for Reagent water, ASTM designation D-1193-51T

In the Mixed Bed Demineralizer, Permutit has developed equipment to produce water with total electrolytes less than 0.2 ppm, silica below 0.05 ppm. It is a single unit ion exchanger containing both anion and cation exchange resins in a homogeneous mixture. In one single stage, many separate demineralizing steps are provided, so that mineral impurities reach the vanishing point. The residual content is so low that conventional methods of analysis cannot be used for accurate determination, and conductivity measurements are customarily used. The types of ion exchangers-both anion and cation-can be varied to meet individual requirements for which the Mixed Bed Demineralizer is used. Through such variation, the Demineralizer can be applied to many different uses. The latest development by Permutit is fully automatic control!

For further information, write to The Permutit Company, Department SI-6, 330 West 42nd Street, New York 36, N. Y.

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